DOCUMENT RESUME

ED 157 662 RC 010 537

AUTHOR	Korporaal, Arie R., Ed.
TITLE	Nature's Classroom. A Guide for the Los Angeles County Outdoor School.
INSTITUTION	Los Angeles County Superintendent of Schools, Calif.
REPORT NO	LACO-75
PUB DATE	75
NOTE	93p.; Revised 1975
EDRS PRICE	MF-$0.83 HC-$4.67 Plus Postage.
DESCRIPTORS	*Activities; Concept Formation; *Conservation (Environment); *Curriculum; Ecology; Educational Objectives; Elementary Education; Environmental Education; Experiential Learning; *Guides; Lesson Plans; Organization; *Outdoor Education; Philosophy; Policy; *Program Descriptions; Residential Programs; Vocabulary Development
IDENTIFIERS	*Los Angeles County Outdoor School CA

ABSTRACT

Promoting understandings in outdoor science and conservation is the primary goal of the Los Angeles County Outdoor School as presented in this guide to its five-day resident program for elementary school pupils. The purpose of various program components is briefly described, including hikes, cabin living, campfires, conservation projects, crafts, dining hall, evaluation and planning, flag ceremony, folk dance and folk singing, library and museum visits, and specialists. A sample daily schedule gives approximate times for a typical day. The 1973-74 curriculum is outlined under four major concepts: (1) an ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical environment, (2) man's attitudes and way of life create an ecological impact on the environment; man's survival depends on his ability to minimize this impact, (3) the earth is in constant motion producing regular predictable changes in the environment to which man adapts, (4) outdoor school is a minicommunity in which each pupil can participate as a citizen and creative person. Under each, activities to accomplish objectives are given, with both outdoor school and classroom learning opportunities, many of which provide for multicultural experiences. The appendix has a glossary in both English and Spanish and site information on the outdoor school. (RS)

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NATURE'S CLASSROOM

A Guide for the Los Angeles County Outdoor School

Office of the Los Angeles County Superintendent of Schools

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"Psst! Remember. Act natural!"

N A T U R E ' S C L A S S R O O M

A GUIDE FOR THE LOS ANGELES COUNTY OUTDOOR SCHOOL

OFFICE OF THE LOS ANGELES COUNTY SUPERINTENDENT OF SCHOOLS-MAY 1965
LACO NO. 75
Revised September 1975

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INTRODUCTION

The resident outdoor school located in a national forest area offers incomparable opportunities to observe and learn about the earth's natural environment and man's place in it. The learning may be called outdoor education (learning outdoors), conservation education (natural and human resource management), environmental education (natural and man-made surroundings), and ecology (science concerned with interrelationships of organisms with their environment).

From all these approaches the desired outcome is to develop understanding of the need for people to make and follow social, economic, and political decisions so that human life on earth can continue and the balance of nature may be maintained.

The following goals have been formulated for the outdoor school program and serve as a basis in developing this guide.

1. Provide first hand learning opportunities for the pupil to discover that all life depends on the environment.

2. Utilize the outdoor environment as an effective learning tool in ecological studies and conservation practices.

3. Utilize the outdoor school program as an effective learning tool to gain understanding of social behaviors, the individual's worth and the interdependence of all mankind.

4. Modification of the individual's behavior and attitudes toward positive and constructive use of his environment.

Part I, The Los Angeles County Outdoor School Curriculum, suggests ideas for teaching outdoor science and conservation education concepts to students who attend outdoor school.

Part II, The Los Angeles County Outdoor School Program outlines the organization, policies and procedures for conducting the outdoor school.

Appendix A contains supplementary information such as a glossary, suggestions for students and teacher references, discussion subjects, charts, sample forms, suggested schedules and other information intended to assist the classroom teacher and school district personnel as well as the outdoor school staff in conducting an outdoor school program with optimum value to the pupils attending.

Appendix B contains samples of forms the classroom teacher will use in preparing her students for attendance at outdoor school and for follow-up evaluation.

OUTDOOR SCHOOL PHILOSOPHY

The primary goal, legal justification, and unique contribution of the Outdoor School to our society lies in its responsibility toward the promotion of understandings in outdoor science and conservation.

The other goals of outdoor education -- social living, work experience, healthful living, etc. -- are equally important and assist us in the achievement of our primary goal. However, these are goals toward which other community agencies work while Outdoor School is unique in its emphasis on science and conservation.

Students live at the Outdoor School for the purpose of studying firsthand the happenings that take place in the out-of-doors. The land itself provides the information and, with the assistance of a qualified teacher, does the teaching. The Outdoor School serves as a stage. It is located in a wilderness area where the natural processes of life are less disturbed by man and happen more dramatically. Science and conservation concepts are more teachable in this environment. Because children come to the out-of-doors to learn, they should spend as much time as possible learning in the outdoors.

We are teaching more than facts; we are also cultivating attitudes. Facts have little meaning without concern and emotional involvement. Developing this concern and emotional involvement is our most difficult job. I do not know of a single method for reaching each child; therefore, we offer a variety of experiences, each of which should contribute to and reinforce the others.

The Outdoor School is a favorable setting in which to promote rational thought. Students can observe that things do not happen without cause. We can help children discover the causes and better understand the relationship between cause and effect (the relationship between man and his environment). Conservation arises out of this understanding and the concern for the quality of future life. We should always remember that, since man set up the standards, he should endeavor to understand them.

We hope to create a respect for the preciousness of life -- all life, whether it be plants, other animals, or man. The key to this respect is learning that each type of life cherishes living as much as man does. A natural extension of this concept is that, because we live together, we must learn to live together through respect for life. The dilemma is: How do we respect the rights of both the individual and the group?

Finally, life for men is more than existing. Perception and understanding and the way they affect our emotions raise us above the level of mere existence. We associate a pleasing emotion with beauty -- it is the beauty and our recognition of it that brings richness into our lives. It is my hope that we can help children discover things in our world which they find are beautiful.

Ray Palmer
Principal, Los Angeles County Outdoor School 1964-1968

THE CURRICULUM ACTIVITIES OF THE LOS ANGELES COUNTY OUTDOOR SCHOOL

Hikes

Hiking is the means by which pupils reach natural ecological settings where they may discover aspects of the natural environment and experience relationships with ecological settings through their five senses.

Cabin Living

The twenty-four hour residence at outdoor school offers opportunities to help children discover how they can live cooperatively with others through democratic process. The cabin is "home" at the outdoor school and a large portion of the pupils' stay is spent in cabin-related learning activities.

Campfires

Campfires at outdoor school are primarily intended to foster a harmonious relationship between individuals, groups and staff members participating and to provide fun and entertainment.

Conservation Projects

One objective of the outdoor school program is that each child shall leave the site with a deep concern for his responsibility for conservation of the earth's natural resources. While each student is participating in his outdoor school activities, he will observe and practice ways that conservation endeavor can improve the environment.

Crafts

Pupils may experience success in creating something that expresses their individual perception from materials collected wisely from natural sources.

Dining Hall

Mealtime activities at outdoor school are planned to provide pupils with experiences from which they may gain understanding of table manners, hygienic practices, and cooperative work values.

Evaluation and Planning

Children attending outdoor school are encouraged to help develop plans for activities of their groups during the week. At least one session is held to review and evaluate the experiences pupils have had.

The Flag Ceremony

Observance of the flag salute required in public schools at outdoor school involves raising the flag each morning and lowering it each evening. The special ceremonies and the outdoor setting provide effective opportunities to strengthen appreciation for our national heritage.

Folk Dance and Folk Singing

Folk dances at outdoor school provide pupils with experiences in movement and recreational enjoyment and may help them understand and appreciate folk music of America and other countries as well as the dances that are part of our cultural heritage.

Singing accompanies many of the activities at outdoor school.

Library and Museum Visits

The outdoor school library is available to pupils at the outdoor school to use in pursuit of information or to amuse themselves.

The museum at outdoor school offers pupils opportunities to entertain themselves as visitors and spectators or to enjoy working on collections, displays and arrangements for the museum, or to undertake research.

Specialists

A representative from the Forest Service or other agency or organization may visit the outdoor school to share pertinent information with classes attending.

SAMPLE DAILY SCHEDULE
(approximate times)

7:00 a.m.	Get up
	Get dressed and washed
	Clean cabin
8:00	Breakfast
8:40	Flag raising ceremony
8:50 - 9:30	Outside cleanup or woodcutting, complete cabin cleanup, make beds, brush teeth, prepare for morning activity.
9:30 - 12:00	Morning activity
12:30	Lunch
1:15 - 2:45	Brush teeth, rest period (possible showers)
2:45 - 4:45	Afternoon activity
4:45 - 5:15	Get ready for dinner (possible showers)
5:15	Flag lowering ceremony
5:30	Dinner
6:15 - 7:30	Brush teeth, relax, prepare for evening activity
7:30 - 8:30	Evening activity
8:30	Prepare for bed (Keep the mood of the group relaxed, calm, and quiet)
9:00	Lights out

Times listed above are approximate because they will vary from day to day and from week to week, depending on weather conditions and the children in the groups. Dining hall duties affect the time schedule and showering times might be different. It is important that we remain flexible.

EXPERIMENTAL CURRICULUM
OUTDOOR SCHOOL

CURRICULUM OBJECTIVE: To provide a curriculum for elementary school pupils attending a five-day resident program in environmental sciences and conservation education at a facility provided by the Office of the Superintendent of the Los Angeles County Schools.

Please refer to Outdoor School Glossary for special ecological and scientific definitions of terms used in curriculum objectives and concepts.

A. CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical environment.

Objectives:

1. The pupil will identify the biotic and the physical environment of an ecosystem utilizing his senses.
2. The pupil will identify the ecosystems at the site.
3. The pupil will identify the reasons for different ecosystems.
4. The pupil will analyze an ecosystem at the site.
5. The pupil will compare and contrast ecosystems at the site.
6. The pupil will compare and contrast their home community with an ecosystem.

B. CONCEPT: Man's attitudes and way of life create an ecological impact upon the environment; man's survival depends on his ability to minimize this impact.

Objectives:

1. The pupil will identify proper behavior in the utilization of the natural environment.
2. The pupil will apply identified proper behavior in the utilization of the environment.
3. The pupil will analyze the negative influences of man on his environment.
4. The pupil will synthesize ways to minimize his impact on his environment.

C. CONCEPT: The earth is in constant motion producing regular predictable changes in the environment to which man adapts.

Objectives:

1. The pupil will describe the seasonal characteristics evident at that time in the environment.
2. The pupil will demonstrate his understanding of climatic adaptation by wearing proper clothing.
* 3. The pupil will discuss the adaptation of the human eye to light level.
* 4. The pupil will listen attentively to the sounds characteristic of the night.
* 5. The pupil will distinguish between a star and a planet, and a star and a constellation.
6. The pupils will discuss that legends or myths have been written about the patterns in the stars.
* 7. The pupil will compare and contrast the environment between night and day in terms of sounds, temperature changes, and animals.

D. CONCEPT: Outdoor school is a mini-community in which each pupil can participate as a citizen and creative person.

Objectives:

1. The pupil will assume his duties as a member of the mini-community.
2. The pupil will participate in the established routine of the outdoor school program.
3. The pupil will translate and respond to new symbols of communication.
4. The pupil will relate the history of the area.
5. The pupil will cite examples of the California Indian, Spanish and Mexican contributions to the nomenclature of the site and the surrounding area.
6. The pupil will participate in folk dances and folk music of our heritage.
7. The pupil will identify and use tools and equipment needed in arts and crafts.
8. The pupil will make a creative art form from natural materials of the site, or develop a creative expression or reproduction about the site.

* These objectives can be met only when weather permits the pupil to experience a hike after sunset (first-hand, direct experience qualification).

THE WATER CYCLE

BASIC VOCABULARY

water cycle
evaporation
condensation
precipitation

BASIC LESSON CONCEPTS

1. Discuss the term "cycle". Suggest bicycle and tricycle to draw the relationship to wheel or circle.
2. Heat water to the boiling point in a pot on a hot plate. Hold a metal tray filled with cracked ice over the pot. Observe the drops of water form on the tray and drop back into the pot. Use the terms evaporation, condensation, and precipitation to describe the actions. Have the students identify the cycle they see.
3. Compare the classroom experiment to nature's water cycle. Have students identify the heat source, water source, and precipitation forms in nature.
4. Continue to boil the water until it is totally evaporated. Observe the residue inside the pot. Relate this to seawater evaporation producing fresh water precipitation.
5. Use the blackboard or a ditto to reinforce the steps of the water cycle.

6. Have students draw their own diagrams of the water cycle, labeling the processes.

EXTENDED VOCABULARY

ground water
surface water
humidity
water table
percolation
watershed

EXTENDED LESSON CONCEPTS

1. Correlate the water cycle with the lesson in the 6th grade Concepts in Science on the reaction of heat on molecules. pp 57-64
2. Analyze the causes of wind, sea and land breezes, high and low pressure areas, etc. and relate these to their effects on precipitation.
3. Discuss radiation heating to explain colder air temperatures at higher altitudes.
4. Discuss different forms of precipitation and their causes; i.e. snow, hail, sleet, etc.
5. Compare relationships between plant leaf sizes, plant water needs, and evaporation.

Developed by Donna Moore, 6th Grade Teacher, El Segundo Unified School District

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will identify the biotic and the physical environment of an ecosystem utilizing his senses.

A-1 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
1. Students will be encouraged to use as many of their five senses as possible to investigate the biotic (plants and animals) and the physical (soil, air, water, rocks, sunlight) environment. 2. Typical experiences include: Air: movement of leaves, sound of the wind; feel of moisture or dryness on the skin; smell of an approaching rainstorm. Water: see movement, clarity or pollution in stream; taste of spring water; sound of stream; feel of the coolness of the stream; smell of fresh water versus stagnant water. Soil: see the color and makeup of layers of soil; hear movement of soil disturbed naturally; feel the texture of soil to determine its parts; smell the soil for decay and moisture. Rocks: observe the shape, color and minerals in a rock; feel the temperature, texture, weight of rocks; taste powdered minerals to guess their chemical composition; pound a rock to listen for hollowness or solidness; smell a rock to discover if there is a characteristic odor.	Basic preparation: Glossary terms: environment living biotic non-living physical 1. Review the five senses of touch, sight, hearing, taste, smell. 2. List the learnings that take place with each sense. 3. Teach proper use of thermometers and reading of thermometers. Additional ideas: 1. Filmstrips and films. (See list) 2. Devise games or activities that utilize a sense or senses. 3. Make plans to tape-record sounds heard at outdoor school. 4. Infer and practice estimating temperature of air, water and/or soil by touch and then measure actual temperature with thermometer.

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will identify the biotic and the physical environment of an ecosystem utilizing his senses.

A-1 (2)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
Sunlight: observe the play of light, shadows, colors during the day and night; feel the temperature of direct and indirect sunlight; smell difference between night and day. Plants: Observe shapes, colors, size; taste specific seeds of leaves; smell specific plants; touch or not touch specific plants. Animals: watch the action of birds, squirrels and other animals; listen for the sounds of animals that are captured; smell characteristic odor of certain animals.	7. Investigate the physics of color. 8. Measure solar energy absorption by placing thermometers in the sun with black, white and colored backgrounds. Have class wear dark shirts and play ball -- next, white shirts and play ball. Discuss and compare physical senses and records of thermometers. 9. Study temperature variations of color, bare ground and covered ground to determine if the physical senses can differentiate the temperatures of the variations. 10. Perform a bean-plant experiment to show the effect of the sun and lack of it on plants. Place one bean in a dark place and another in the sun and another in a box with a hole to show how the plant grows toward the light. 11. Do direct research on the various sunlight requirements of different plants and animals. 12. Experiment with the effect of air temperature on the distance sound travels. 13. Investigate the connection between smell and taste.

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will identify the biotic and the physical environment of an ecosystem utilizing his senses.

A-1 (3)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	14. Stress the importance of using the senses to identify the physical environment of a "feel box" or "touch box" containing various objects which can only be felt, not observed.
	15. Practice measuring temperatures of air and water by sense of feel.
	16. Develop a system for measuring direction and velocity of air masses by the physical senses.
	17. Practice recording of observations at designated intervals, i.e., temperature, humidity, rainfall, wind velocity.
	18. Experiment with the development of human senses; see with senses other than sight.
	19. Practice observational skills by observing, describing and classifying rock composition, plant parts, reptiles, insects, etc.
	20. Examine drop of pond water or water from an aquarium under a microscope.
	21. Compare stream organisms at Colby Ranch to organisms seen in a drop of pond water from school or a fresh water aquarium.
	22. Select a tree on school grounds - describe, measure and mark a place in September. Repeat in June -

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will identify the biotic and the physical environment of an ecosystem utilizing his senses.

A-1 (4)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	measure growth, changes. Keep a diary of observable changes, (leaves falling, blossoms, etc.) 23. Use a shadow stick to find North - direction - (sun dial) Need (a) level site with sun all day (b) 4' stick (c) pegs to mark tip of shadow - this line will be East and West 24. Analyze one square foot of soil for all identifiable components.
	CLASSROOM TEACHER NOTES & COMMENTS

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interracting with their physical and chemical environment.

OBJECTIVE: The pupil will identify the ecosystems at the site.

A-2 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
Three fieldtrips will be taken to the following ecosystems in the area: 1. Chaparral 2. Aquatic-Riparian (creek - streambanks) 3. Mixed evergreen forest Oak, Spruce. Basic characteristics of each ecosystem will be identified and taught using all the senses. Children will identify each area as a different community.	Basic preparation: Glossary terms: Aquatic, Chaparral, Evergreen, Riparian, Ecosystem 1. Practice the proper use of a magnifying lens. ADDITIONAL ACTIVITIES: 1. Films and filmstrips. 2. Set up a closed ecosystem such as a terrarium. Identify the components of this type of ecosystem. 3. On the school ground identify the producers, consumers and decomposers of as many different environments as can be found. 4. Take a walking trip to a vacant lot, Palisades or park, seashore, aquarium to observe life cycles of plants and animals. 5. Repeat the trips at different seasons of the year to compare and contrast the ecosystems at different seasons. 6. Practice skills of identification and classification in any area. Stress use of senses and the powerful tools they provide for man.

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will identify the ecosystems at the site.

A-2 (2)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	7. Perform a series of soil investigations - for fertility and water-holding capacity changes after a rain. How does this relate to water table? 8. Study fault maps of Southern California. 9. Develop a sedimentary type of rock by mixing top soil, gravel, humus with water in a jar and let stand several months. 10. Demonstrate various features of rocks such as hardness, cleavage, luster. 11. Test the pH of soil with a pH kit to determine acidity and alkalinity. What will grow best in the two acid pH? Best in alkaline pH? 12. Prepare soil samples of local area (school) How does it vary? 13. Study the clay content of the soil by: Knead soil and water to make the soil hold together as a lump. The greater the clay content the easier the soil will hold together. Check various kinds of soil from different locations around school or neighborhood.

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will identify the ecosystems at the site.

A-2 (3)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	14. Develop an enriched soil through the use of earthworms. 15. Pound some rocks into soil using different kinds of rocks. Check for porous quality by pouring water through. Plant a seed in each batch. Will it support growth? 16. Add humus and varying kinds of ground rock to mixture and check for porous quality of soil. What makes soil able to hold water? Plant seed.
	TEACHER NOTES AND COMMENTS

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will identify the reasons for the different ecosystems.

A-3 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
Varying locations will be used. Field trips; (1) Chaparral (2) Aquatic - riparian (3) Mixed evergreen The following limiting factors will be investigated on the hikes for each of the ecosystems. Encourage full use of all senses in the investigations. Climate: temperature, wind, water Light-energy: direct or indirect exposure Air: altitude, 0_2 supply, quality Soil: type, slope, amount, erosion Biotic: population, food supply Water: amount, quality Investigate the geology of the area and determine the influence on the ecosystems: topography, soil formation, erosion factor, water holding factors. Point out evidence of damage to trees and plants. Attempt to get pupils to speculate on causes of damage and how the living thing has compensated for the damage; i.e. fire, overpopulation, drought, flood, overuse by people, natural causes like falling trees, dry creep.	Basic preparation: Glossary terms: climate light-energy soil adaptation water cycle humus litter duff metamorphic igneous mineral fault earthquake organic inorganic weathering erosion Additional ideas: 1. Identify the ways plants and animals vary and have adapted themselves to an ecosystem other than those found at Outdoor School; lake, marine, desert, urban. 2. Name various energy (food chains) identifying producers, consumers and decomposers. Draw illustrations of some food chains.

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will identify the reasons for the different ecosystems.

A-3 (2)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	3. State and illustrate CO_2 and O_2 cycles, evaporation and condensation.
	4. Identify the nitrogen cycle.
	5. Culture the bacteria that fix nitrogen from the air which grow on the roots of the legumes. See Concepts in Science Book VI.
	6. Set up a closed (sealed) terrarium and manipulate the limiting factors. Record the results.
	7. Observe various life cycles in plants and animale i.e., silkworms, tadpoles, mealworms - identify the limiting factors.
	8. Discuss the concept of interdependence and interrelationships of plants and animals.
	9. Write as many life chains (food energy) as can be found.
	10. Research and set up learning center in the development of one specific food chain.
	11. Comparison of plant growth in various levels of fertility - manipulate light variable in growth in sunlight vs. growth in closet.

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will identify the reasons for the different ecosystems.

A-3 (3)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	12. Using the home or classroom as an ecosystem, discuss tolerance ranges to such environmental factors as room temperature, ventilation and noise level. 13. Have students do research on the glossary words. Plan to do some field work at outdoor school on the research: Collect soil samples, rock samples, observe and record weather for the week. Set up classroom weather station. 14. Study cross-section of tree for limiting factors such as moisture and its relationship to the wider rings, i.e., analyze seasonal changes in growth. 15. Study damaged plant or tree growth. Analyze the growth to determine cause of damage and how the tree or plant has compensated. 16. Identify and discuss limiting and what happens when tolerance limits are exceeded. Define the term "tolerance limits."

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will identify the reasons for the different ecosystems.

A-3

CLASSROOM TEACHER - NOTES AND COMMENTS

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will analyze an ecosystem at the site.

A-4 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
Field trip to at least one of the following for an in depth study of an ecosystem: 1. Chaparral 2. Aquatic - riparian 3. Mixed evergreen	Basic preparation: Glossary terms: Producers Consumer Decomposers Photosynthesis Predator Herbivore Carnivore Bacteria Fungi Chlorophyl Scavenger Saprophyte Parasite Symbiosis
I Identify the: Producers - what plants? Consumers - evidence of insects, etc. Decomposers - i.e., fungi, bacteria	
II Using direct first-hand experience investigate the physical environment of the biotic community. air water soil climate	Review the principles of photosynthesis. Review the CO_2 and O_2 cycles. Additional ideas: 1. Practice observing and classifying techniques in all situations - use all the senses to see, feel, hear, smell and taste when appropriate. For example: compare leaves and classify according to similarities and differences using all the senses. Break the first classification down into sub-categories.

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will analyze an ecosystem at the site.

A-4 (2)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	2. Classify rocks, trees, water, plants and animals devising a system for naming or grouping - sub-group into groups according to their functions or whatever divisions seem appropriate. 3. Divide living things into producers, consumers or decomposers. 4. Extend the line of the primary consumers to secondary consumers. 5. Discuss gradations of the groups - the area where two groups overlap. 6. Measure the flow of water from the faucet by timing the time necessary to fill a gallon container. How is rainfall measured? How is a stream measured? 7. Research water requirements for individuals, homes, trailers. How many gallons does each individual use each day? What is the average usage? 8. Learn to count rings of a cross-section of a tree to determine age of a tree. 9. How is the purity of the air - ozone count - determined?

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will analyze an ecosystem at the site.

A-4 (3)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	10. Analyze the school cafeteria operation to see if it is organized similarly to an ecosystem. 11. Use knowledge of photosynthesis and the needs of green plants to design and construct a closed system terrarium. 12. Cite examples of symbiotic relationships in school or home environment. Define the term "symbiotic relationships."
	CLASSROOM TEACHER-NOTES & COMMENTS

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will compare and contrast ecosystems at the site.

A-5 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
During field trips to the various ecosystems the pupils will compare and contrast the climate, soil, water supply and plants and animals with the other ecosystems visited. During the "in depth" study of one of the communities the pupils will compare and contrast the physical and biotic aspects of two or more ecosystems in depth. Continue to emphasize the use of the senses to help compare and contrast.	Basic preparation: All previous glossary terms from Concept A-1 through A-4 Additional ideas: 1. Films and filmstrips. 2. Compare and contrast local ecosystems on the school grounds. 3. Give as much experience as possible in comparing objects, events, etc. Practice naming similarities and differences. Use the senses as much as it is appropriate to do so. This skill need not be limited to the Outdoor School curriculum but should be used and refined in all areas. 4. Set up matching learning centers for comparisons, i.e., food chains, soil analysis, etc. 5. Take field trips where lectures often emphasize, compare and contrast of environments, functions, etc. L.A. County Arboreteum Huntington Library and Art Gallery Palos Verdes Botanical Gardens - Cabrillo Beach tide pools and museum.

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will compare and contrast ecosystems at the site.

A-5 (2)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	6. Identify the ways plants and animals vary and have adapted themselves in a marine ecosystem. Beach field trip. Compare and contrast adaptations between marine environment and Colby Ranch.
	CLASSROOM TEACHER-NOTES & COMMENTS

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will compare and contrast their home community with an ecosystem.

A-6 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
Discuss the relationship of man's ecosystem (the city) with the natural ecosystem. Producers: Farmer, manufacturer Consumers: People Decomposers: Sanitation department, recycling centers, swap meets, rummage sales, etc. Physical environment: water department, sewage treatment and disposal, air, soil, light-energy.	Basic preparation: Glossary terms A-1 through A-4 Additional ideas: 1. Identify the physical environments of the ecosystem at the beach or desert. Compare with urban environment. 2. Make dioramas of the various biomes; forest, aquatic, desert, grasslands. 3. Develop projects of the site biomes after returning from the Outdoor School. 4. Set up a feeding station at home or at school to observe and identify animals or birds. Photograph and keep diaries on use of the feeding stations. 5. Make tape recordings of Outdoor School sounds and tapes of home school sounds to compare and contrast. 6. Cite as many instances as possible of the ways man has abused his environment at Outdoor School and at home. Are the abuses the same or are they different? 7. List all the adaptations man has invented to help him adapt to his city environment.

CONCEPT: An ecosystem consists of natural communities of plants and animals interrelated and interacting with their physical and chemical environment.

OBJECTIVE: The pupil will compare and contrast their home community with an ecosystem.

A-6 (2)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	8. Investigate the effect of air, water, solid waste and noise pollution on man and his environment.
	9. Investigate the sewage disposal system in your city by touring the Hyperion Plant.
	10. Invite guest speakers from Department of Water and Power to investigate the water department in your city as to procurement, purification and distribution.
	11. Invite a guest speaker from Standard Oil to find out the pollution safeguards they are currently using.
	12. Role play a community vs. business point of views. Coca-Cola Ecology game does this well.
	13. Do an urban study of home community as a cycle process. (Is anything missing in your community?)
	14. Analyze the changes which man has brought about in your own community. What was it like in its natural state? How long has it taken (years) to bring about these changes?

CONCEPT: Man's attitudes and way of life create an ecological impact upon the environment; man's survival depends on his ability to minimize this impact.

OBJECTIVE: The pupil will identify proper behavior in the utilization of the natural environment.

B-1 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
While hiking, Outdoor teachers will instruct the pupils how to: 1. use trails or paths at all times and walk in the middle of the tread or trail. 2. Avoid breaking down the berm. 3. Avoid short cuts or cross-countrying unless led by an adult. Why? 4. dispose of trash in an acceptable way. 5. respect the right of all life to exist by not: picking flowers or green plants without permission nor indiscriminately killing or harming animals nor starting any fires without proper instructions. 6. respect the rights of others by not: carving initals on trees nor painting on rocks nor by vandalizing public property.	Basic preparation: Glossary term: Berm 1. Discuss littering with your class. 2. Instruct pupils with Poloroid cameras to carry a litter bag with them on the trail. Additional ideas: 1. Filmstrips and films. 2. Identify and list all the things you want - analyze the resources needed to make these things. 3. Evaluate the local effects of the utilization of the natural resources. 4. Plan and carry out an anti-litter campaign at school and/or the community. 5. Investigate the cost of cleaning up litter upon the highways. 6. Discuss predators and over-population of animals. What happens? 7. Look for evidences of erosion and depletion of non-renewable resources. 8. Discuss terms renewable and non-renewable resources. 9. Look up information on trail signs-how to read a trail map - identify the symbols.

CONCEPT: Man's attitudes and way of life create an ecological impact upon the environment; man's survival depends on his ability to minimize this impact.

OBJECTIVE: The pupil will identify proper behavior in the utilization of the natural environment.

B-1 (2)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	10. Learn to read a topography map. 11. Discuss water usage from running streams. Should this water be used for drinking? How could it be treated to be used for drinking? 12. Set up a learning center to research a specific area man has destroyed by misuse.
	CLASSROOM TEACHER NOTES AND COMMENTS

CONCEPT: Man's attitudes and way of life create an ecological impact upon the environment; man's survival depends on his ability to minimize this impact.

OBJECTIVE: The pupil will apply identified proper behavior in the utilization of the environment.

B-2 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
Students will participate in a planned project to improve or protect the environment at the outdoor school. 1. trail building 2. erosion control 3. fire prevention work 4. tree planting in season The Outdoor School staff will observe and reinforce good outdoor manners and trail courtesy.	Basic preparation: Glossary term: Conservation Additional ideas: 1. See films and filmstrips. 2. Have students investigate their school grounds and identify littered areas. Infer the cause and figure out a way to correct the situation in a positive way. 3. List suggestions for conservation of school supplies and renewable resources. 4. Develop ways to re-cycle paper used in classroom. 5. Try out some of these suggestions in #3 and #4. Keep a record of whether they will work; if not why were they not successful? 6. Identify the proper behaviors which man has displayed to properly use his natural resources. 7. Pupils can conduct a survey of pollution problems in their town, i.e., air, water, noise, number of garbage cans per house, etc. 8. List the behaviors which would not be considered appropriate utilization of the environment. 9. Make a check list to see if any behaviors were changed after a week at Outdoor School.

CONCEPT: Man's attitudes and way of life create an ecological impact upon the environment; man's survival depends on his ability to minimize this impact.

OBJECTIVE: The pupil will analyze the negative influences of man on his environment.

B-3 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
On field trips look for the impact of man on the site of the outdoor school. Water supply Erosion Solid waste disposal Sewage system Soil removal Point out examples of negative activities by people: Man caused erosion Solid waste dump Polluted stream and river Bullet holes in signs Carvings in trees Names painted on rocks	Basic preparation: Glossary term: Erosion Ground water Pollution 1. Read and collect current printed articles about destruction of natural renewable resources. 2. Research current legislation which permits continued negative influences in the use of the environment. (Dune buggies, snow mobiles, cycles, mini-bikes.) 3. Obtain environmental simulation games with open ended answers which allow pupils to study the negative influences which man must consider in building dams, new airports, freeways, marinas. (See Coca Cola game) 4. Contour mapping - see Geography project materials. Geological Survey Map reading models - (Van Waters & Rogers supplier) 5. Study geology land form models- Hubbard 6. Investigate your neighborhood and list all the negative influences you see, hear, or smell. 7. Do research on air, water, noise and solid waste pollution.

CONCEPT: Man's attitudes and way of life create an ecological impact upon the environment; man's survival depends on his ability to minimize this impact.

OBJECTIVE: The pupil will analyze the negative influences of man on his environment.

B-3 (2)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	8. Determine the cause for the extinction or near extinction of some living things native to California (Grizzly bear, Condor, orange trees, Ponderosa Pine.) 9. Have a debate on the subject: Motorized vehicles may not be driven off the roads.
	CLASSROOM TEACHER NOTES AND COMMENTS

CONCEPT: Man's attitude and way of life create an ecological impact upon the environment; man's survival depends on his ability to minimize this impact.

OBJECTIVE: The pupil will synthesize ways to minimize his impact on his environment.

B-4 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
1. Implement any feasible suggestion a student might make to improve or correct our impact on the outdoor school site. 2. Use positive reinforcement with those students that demonstrate in their cabin living an effort to minimize the use of water and electricity, take care of their personal belongings, etc. 3. Discuss what we can do to prevent waste or improve our utilization of our natural resources in our daily lives. 4. Discuss the differences between renewable and non-renewable natural resources.	Basic preparation: Glossary terms: Natural resources Non-renewable resources Renewable resources Additional ideas: 1. Collect seeds and plant them. Discuss why this is important. 2. Develop a nursery for trees to be brought to Outdoor School for planting during January and February. Sixth grade pupils will teach fifth grade pupils how to keep plants growing until planting time in the forest the following year. For seed ($12.00 per lb.) contact: Chuck Hudson County of Los Angeles Forestry and Fire Warden 1320 N. Eastern Ave. P.O. Box 3009 Los Angeles, Calif. 90054 3. Develop conservation project for the class participation in community or school. 4. Bring in a log or natural object-list as many uses as possible for the object-from art to science. 5. Plant trees - develop gardens, etc., at local site.

CONCEPT: Man's attitude and way of life create an ecological impact upon the environment; man's survival depends on his ability to minimize this impact.

OBJECTIVE: The pupil will synthesize ways to minimize his impact on his environment.

B-4 (2)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	6. Cite examples of changes in immediate school area which man has brought about - can be good or bad.
	7. Plan projects to help repair damage caused by men.
	8. Current events on man and his impact on his environment; both positive and negative.
	9. Investigate how to make compost pile from cuttings, leaves and bushes, etc.
	10. Arrange a display of consumer goods and have the pupils determine if an item is the product of a renewable or non-renewable resource. food item paper or wood object can of oil plastic item metal item jars of soil, water and air
	11. Encourage student motivated ideas to implement ecology-oriented activities in the classroom, school, home or community.
	12. Write to polluting companies or newspapers (letters to the editor) expressing feelings about pollution or positive ways to improve the environment.

CONCEPT: Man's attitude and way of life create an ecological impact upon the environment; man's survival depends on his ability to minimize this impact.

OBJECTIVE: The pupil will synthesize ways to minimize his impact on his environment.

B-4 (3)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	13. Have guest speakers from polluting companies to discuss pollution problem vs. the contribution the company or product is making to the community. 14. Develop a series of pollution posters, comic strip series or motion picture film.
	CLASSROOM TEACHER NOTES AND COMMENTS

CONCEPT: The earth is in constant motion producing regular predictable changes in the environment to which man adapts.

OBJECTIVE: The pupil will describe the seasonal characteristics evident at that time in the environment.

C-1 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
On the field trips at the Outdoor School site help the children use their five senses to learn the seasonal characteristics in evidence when they are at Outdoor School. Discuss with the pupils the seasonal characteristics evident at the time of his attendance: Summer (Sept.) Hot and dry, stream flow is low, many insects, fruit is mature on the apple trees, oak trees, grape vines, walnut trees. Fall (Oct. to Dec.) Fall colors showing on deciduous trees, leaves falling, poison oak leaves are red, nights are cold, days vary from cold to warmish, some fog or rain can be expected, Manzanita berries are red. Winter (Jan. to Mar.) Cold days, freezing nights, snow is possible, pipes can freeze, heavy rains are possible, no insects flying around, deciduous trees are bare, lady-bug beetles hibernate in the bushes for the season. Spring (April to June) Insects begin to emerge, reptiles seen scurrying around, frogs, tadpoles are seen, plants are budding out new leaves, Manzanita berries form, birds arrive to nest, young mammals appear, pollen in the air.	Basic preparation: Glossary terms: By season Insect Deciduous Climate Weather Nymph Larva Amphibian Reptile Pollen Additional Activities: 1. Filmstrip and films. 2. Make charts and record seasonal characteristics - weather, flowers, trees, etc. 3. Visit local weather station and make their own classroom weather station. 4. Learn about, and how to use weather recording instruments. 5. Develop models of the relationship of the tilt of the earth to the sun which results in the seasons. 6. Study air masses and cloud formations and how they move.

CONCEPT: The earth is in constant motion producing regular predictable changes in the environment to which man adapts.

OBJECTIVE: The pupil will describe the seasonal characteristics evident at that time in the environment.

C-1 (2)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	7. Using an almanac or other source book study the folk saying about the weather, i.e., "Ring around the moon"- "Red at night - Sailors Delight" "Red in the morning, Sailors take warning." 8. Use a shadow stick to determine season of year. If pegs curve toward center pole= winter; if pegs curve away from the pole=summer. 9. Set up a snapshot record of specific plant life through the four seasons. 10. Bring in plant samples representing season for still-life art work.

CONCEPT: The earth is in constant motion producing regular predictable changes in the environment to which man adapts.

OBJECTIVE: The pupil demonstrates his understanding of climatic adaptation by wearing proper clothing.

C-2 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
Children will have extremes of hot and cold temperatures and must be prepared to dress appropriately. IN THE WINTER - Extremes of temperature and rain - need of raingear as well as layers of clothing. IN THE SPRING AND SUMMER - Opportunity to dress for comfort in possible extremes of temperature range; can be wet or dry. Opportunity to choose - footwear which is appropriate; boots, tennis shoes, etc. Why not soft sole moc casins? If head, hands and feet are warm the rest of the body will be warm.	Basic preparation: Glossary terms: Adaptation 1. Discuss the list of clothing given the pupils. Emphasize that it is best to bring old comfortable clothing, but if they buy new clothes it should be washed before wearing to remove any possibility of irritating the skin, especially jeans. 2. Discuss the principle that air is a natural insulation. Several layers of clothing are warmer than one heavy jacket. 3. Discuss footwear suitable for rough, rocky terrain and that is of the proper fit--should be able to wear two pairs of socks for warmth in late fall and winter. 4. Discuss the difference between the terms waterproof and water repellent. Water repellent implies water will leak through eventually. Waterproof implies water will not go through.

CONCEPT: The earth is in constant motion producing regular predictable changes in the environment to which man adapts.

OBJECTIVE: The pupil demonstrates his understanding of climatic adaptation by wearing proper clothing.

C-2 (2)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	Additional Ideas: 1. Films and filmstrips. 2. Cite examples - adaptation to climate by animals - fur length, feathers, skin texture, etc. 3. Using slides, filmstrips or National Geographic magazines review the relationship between weather and clothing. Has man adapted to climate through the type of clothing he uses? 4. Read weather maps in local papers. 5. Practice reading of instruments related to weather charting of data and how to compute averages. 6. Obtain photos taken from weather satellite from which predictions are made; available at weather bureau offices. 7. Evaluate synthetic materials vs. natural materials in making of clothing. If it is light and looks cool, is it really the coolest? 8. Investigate heat absorption and color.

CONCEPT: The earth is in constant motion producing regular predictable changes in the environment to which man adapts.

OBJECTIVE: The pupil will discuss the adaptation of the human eye to light level.

* C-3 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
Field trip will be after dinner in the dark. I. Children will have opportunity to let eyes adjust by sitting outside in the dark for ten to twenty minutes in preparation for night hike. II. Discuss how the pupil of the eye dilates in dim light. III. Discuss why flashlights are not to be used since they cause the pupil of the eye to contract and cause pain to the individual whose eyes have dilated.	Basic preparation: Vocabulary: 1. Contract 2. Dilate 3. Pupil 4. Iris Study structure of human eye. Additional ideas: If there is a dark room, such as a projection room have the students do this experiment: 1. Draw a clock face on the chalkboard. 2. Have one student stare into a light for several seconds, 25 watt globe or 2 battery flashlight for no longer than one minute. 3. Turn off the room lights; quickly draw the hour hand on the clock face. 4. Time the period of time it takes for the student to call out the position of the hour hand on the clock. 5. Chart and discuss the structure and function of the human eye. 6. Study the take apart models of the eye. 7. Have the school nurse discuss the functions of the eye - how eyes are tested - what safety precautions are important.

CONCEPT: The earth is in constant motion producing regular predictable changes in the environment to which man adapts.

OBJECTIVE: The pupil will discuss the adaptation of the human eye to light level.

* C-3 (2)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	8. Research the structure of other animal eyes and how they are adapted to seeing at night. 9. Discuss the methods by which animals see using sonar vibrations. 10. Discuss safety precautions which should be considered while at school, home or Outdoor School - how to carry objects - should sticks be carried? - why rocks should not be thrown.
	CLASSROOM TEACHER NOTES AND COMMENTS

CONCEPT: The earth is in constant motion producing regular predictable changes in the environment to which man adapts.

OBJECTIVE: The pupil will listen attentively to the sounds characteristic of the night.

* C-4 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
I Pupils will have opportunity to listen to sounds of the night on the night hike or in their cabins. II Students will walk as silently as possible during the night hike utilizing their ears to hear all sounds. III Students shall, weather permitting, sit silently in the out-of-doors at night time. IV Record sounds of one area at night and then in the daytime. Compare and contrast the two. Use these as motivation for creative writing, art expression, etc.	Basic preparation: Practice sitting with eyes closed and listening to the sounds that are around you. Begin with 30 seconds and work up to three minutes. Additional ideas: 1. Identify sounds which are common when heard as sounds only from a tape recorder. 2. Tape examples of animal calls - such as barking. Look for patterns to identify as characteristic of the animal. Listen for differences in the patterns. 3. Bring a cassette tape and have a student tape a night hike. Later on in the classroom play the tape and plan an activity based on it.

CONCEPT: The earth is in constant motion producing regular predictable changes in the environment to which man adapts.

OBJECTIVE: The pupil will listen attentively to the sounds characteristic of the night.

* C-4

CLASSROOM TEACHER - NOTES AND COMMENTS

CONCEPT: The earth is in constant motion producing regular predictable changes in the environment to which man adapts.

OBJECTIVE: The pupil will distinguish between a star and a planet, and a star and a constellation.

*C-5 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
Weather permitting: I Children will have a night hike and an opportunity to view the stars, planets and constellations without any interference of artificial light. II Differences between stars, planets and constellations will be discussed. III Some of the seasonal constellations, including the circumpolar constellations visible in the mountains will be pointed out. IV Meaning of light-year will be discussed while the children are viewing the stars. V Relative distances of planets will be discussed.	Basic preparation: Glossary: Star Planet Constellation Light-year Additional ideas: 1. Have students consult a star atlas and determine what constellations should be visible the week they are at outdoor school. 2. Reference: The Natural History magazine has a monthly article entitled "Sky Reporter" which depicts the constellations and lists the planets visible in the night sky. 3. Discuss skywatching and how to describe the universe. 4. Locate the planets in view at special seasons by watching the astronomy section of the local newspaper. 5. Make a model sky and locate the major planets in view of the season. 6. Do some sampling techniques -- scatter toothpicks evenly over a table top. Devise a sampling method for counting a small sample. 7. Now apply same technique to counting the stars.

CONCEPT: The earth is in constant motion producing regular predictable changes in the environment to which man adapts.

OBJECTIVE: The pupil will distinguish between a star and a planet, and a star and a constellation.

* C-5 (2)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	8. Review the solar system. Lay out the solar system in scale using a string on the playground. 9. Compare the size of the planets using models or charts. 10. Draw some of the well known constellations as stick figures. Use some dot to dot sketches. Challenge children to find these constellations in the real sky.
	CLASSROOM TEACHER NOTES AND COMMENTS

CONCEPT: The earth is in constant motion producing regular predictable changes in the environment to which man adapts.

OBJECTIVE: The pupils will discuss that legends or myths have been written about the patterns of the stars.

C-6 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
I The children will have the opportunity to tape a myth they have created on the night hike. II On the night hike relate a legend or myth about one of the constellations. or III Have a student tell a legend or myth they have learned in class. or IV Have the students make up their own legend or myth about a constellation. V Begin a collection of student created myths to play on the night hike.	Basic preparation: None Additional ideas: 1. Filmstrips and films on mythology. 2. Listen to myths on records. 3. Make models of the constellations-see the patterns. 4. Make up some myths about the constellations. 5. Look up the history of the Spanish, Mexican or Indian legends. 6. Have students look up legends or myths about the constellations. Prepare the legend or myth for presentation to the class: story-telling format, drama format or visual format. 7. Look in folk tale books for ethnic legends. Reference: Dipper full of stars. 8. Discuss the relationship of stars and astrology.

CONCEPT: The earth is in constant motion producing regular predictable changes in the environment to which man adapts.

OBJECTIVE: The pupil will compare and contrast the environment between night and day in terms of sounds, temperature changes and animals.

C-7 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
Night hike: On fieldtrips point out the animal tracks of our nocturnal animals. On the night hike have students note the sounds that are missing and the new sounds they hear. Discuss the distance sounds travel during the day and during the night. Before leaving on the night hike ask students to note temperature change as they hike from one area to another. Later discuss what they noted. Discuss changes in: 1. Clothing 2. Air currents on trails 3. Feel warmth or coldness of cheeks 4. Warm ridges, cooler canyons 5. Reversal in air currents	Basic preparation: Vocabulary: Nocturnal animals Help prepare the students for the night hike by instilling in them the idea that there is nothing to be afraid of at the outdoor school site during the night time. Additional suggestions: 1. Individual projects to compare variations in sounds at night and day at home. 2. Tape sounds of day and sounds of night at home, at school, outside, etc. Compare and contrast these sounds. 3. Research nocturnal animal habits of animals most likely to be found about 3700 feet in the latitude and longitude of Southern California. 4. Research habitats of snakes - establish wise behaviors to use in areas where snakes may live - consider seasons, etc.

CONCEPT: Outdoor school is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will assume his duties as a member of the mini-community.

D-1 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
Each student will assume the following duties on a rotation basis: Table setter Dish washer Flag ceremony Cabin Housekeeping Song leader if he chooses to do so. Each student will keep his own bed and belongings in a neat condition, and help in the daily housekeeping of the cabin. Some students will assist the staff in preparing for a school activity such as woodgathering for campfire or getting equipment for folk dancing. All students will assume responsibility for keeping the school grounds clean and assisting in any beautification activities.	Basic preparation: Discuss the various duties that each student will be asked to do. Explain that the duty responsibility is on a rotation basis. See Part II Appendix C Sample Kaper Chart Additional ideas: 1. Films and filmstrips on etiquette and manners. 2. Prepare a report on flag etiquette. 3. Learn a song to use during the flag ceremony. 4. Learn how to introduce people to each other and how to carry on a conversation. 5. Develop a list of behaviors helpful to family or group living. 6. Prepare a bacteria study on dishes rinsed in clear water compared with dishes rinsed in sanitized water. 7. Discuss and role play some group living situations or problems and possible solutions.

CONCEPT: Outdoor School is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: Pupil will assume his duties as a member of the mini-community.

D-1

CLASSROOM TEACHER - NOTES AND COMMENTS

CONCEPT: Outdoor School is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will participate in the established routine of the Outdoor School Program.

D-2 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
Each student will participate in the following activities which are established parts of the outdoor school program: Fire drill Fieldtrips Work projects to improve the environment Folk dancing & folk singing Mealtime schedule Night hike and star study Campfire Arts and crafts Write one letter home Health practices; sleep, rest and cleanliness routines as established by the outdoor school program.	Basic preparation: Practice addressing an envelope. Students are to use their home address on their letters, not the school address. Discuss table manners and courtesy. Show students the sample of the weekly schedule in the Appendix A. Additional ideas: 1. Discuss the roles of a host, hostess, hopper and "cleaner-upper." Why is each important? See Part II Appendix C 2. Develop anticipated good practices for behavior on the trails, in the rooms, in the dining room. 3. Special reports on health, such as sleep, rest, nutrition and dental care. 4. Analyze the menu served at outdoor school in terms of meeting nutritional needs. 5. Plan and carry out a work project on their own school grounds to improve their school environment.

CONCEPT: Outdoor School is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will participate in the established routine of the Outdoor School Program.

D-2

CLASSROOM TEACHER - NOTES AND COMMENTS

CONCEPT: Outdoor School is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will translate and respond to new symbols of communication.

D-3 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
The children will have the opportunity to respond to: An arm extended over-the-head which means - "be silent." A rapid continuous ringing of the gong which means - report to the dining hall for meals. A series of double rings on the gong means fire drill - go immediately to the assembly area.	Basic preparation: Practice the hand signal for silence. Compare school bell system with the outdoor school gong system. Additional ideas: 1. Discuss different methods available for getting attention of a group - scouts, teachers. 2. List the kinds of symbols of communication and their meanings at school - bells, flags, etc. 3. Discuss coded words which could be used for safety purposes, i.e., "drop" in a drop drill or "freeze" if movement is to be stopped abruptly. 4. Discuss what possible hazards might exist that children should be aware of.

CONCEPT: Outdoor School is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will translate and respond to new symbols of communication.

D-3

CLASSROOM TEACHER - NOTES AND COMMENTS

CONCEPT: Outdoor School is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will relate the historical history of the area.

D-4 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
Students will visit the Colby museum, the Colby graves and learn about the Colby's and their homestead. Students may see the site of the Colby sawmill, Joe Argay's cabin and Nellie's apple orchard. Students may hear the legend of the Lost Indian Tribe on Strawberry Peak.	Basic preparation: None. Please save this material for the outdoor school staff. Additional ideas: 1. Have students develop a skit based on the Colby story. 2. Have students make a diorama of Colby's Ranch as it might have been when the Colby's lived there. 3. Research the maps of the mountain area around the Outdoor School. 4. Trace the historical discovery of the area. 5. Discuss how the first users of the area might have lived. 6. Cite contributions each of the Spanish, Mexican or Indian people might have made to the area.

CONCEPT: Outdoor School is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will relate the historical history of the area.

D-4

CLASSROOM TEACHER - NOTES AND COMMENTS

CONCEPT: Outdoor School is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will cite examples of the California Indian, Spanish and Mexican contributions to the nomenclature of the site and the surrounding area.

D-5 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
The children will have the opportunity of having the Spanish, Mexican and Indian backgrounds of the following words noted as they are used by the staff on the field trips at Outdoor School. Chaparral Yerba Santa Yerba Buena (white sage) Manzanita San Gabriel Mountains Angeles Forest Arroyo Seco Arroyo Willow Potrero (flat area) Cienaga (boggy, spring) Tujunga River	Basic preparation: Look up meanings for words Additional ideas: 1. Trace bus route to outdoor school and list the names of cities the bus will go through. How many are Spanish or Indian names? 2. Develop a dictionary of Spanish, Indian or Mexican terms. 3. Identify as many plants having a Spanish, Mexican or Indian name grown in the city. 4. Research the medicinal and general usage of the plants in Southern California. Make a reference book with pictures or leaf prints to see if the plants can be located at Outdoor School. 5. Build a dictionary of Spanish terms still used in Southern California - translate the meanings, i.e., plants, mountains, rivers, etc.

CONCEPT: Outdoor School is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will cite examples of the California Indian, Spanish and Mexican contributions to the nomenclature of the site and the surrounding area.

D-5

CLASSROOM TEACHER - NOTES AND COMMENTS

CONCEPT: Outdoor School is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will participate in folk dances and folk music of our heritage.

D-6 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
Students will have periods of singing after meals, at campfires and occassionally in small groups. Encourage any small groups who might wish to develop a song or skit or presentation for the rest of the Outdoor School. Encourage the staff to give a singing presentation or skit as a model for the children to develop and present later in the week. Pupils will participate in one evening of folk dancing. Review and reinforce accepted behaviors in folk dancing. Have the staff demonstrate dances.	Basic preparation: Practice folk dancing and singing songs. Additional ideas: 1. Prepare a program that includes folk dancing and folk singing for PTA or other classes. 2. Dramatize a folk ballad. 3. Listen to folk music. 4. Tape some guitar or other instrumental music as performed by the class. 5. Practice a song or dance which the class could demonstrate and teach another class. 6. Experiment with improvisation of dances to a modern or folk record. 7. Suggested titles: ROUSING - "My Hat Has Three Corners" - "Old McDonald" - "I Love the Flowers" - "Happy Wanderer" - "Bingo" - "Good Morning Sunshine" (Beatles) - "Chiapanecas" (Bring me my breakfast right now) - "Love Somebody" - "This Old Man" - "Ford Song" - "I'm Gonna Sing" - Spirit - "Tang a lay-o" - "La Raspa" - "Skip To My Lou"

CONCEPT: Outdoor School is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will participate in folk dances and folk music of our heritage.

D-6 (2)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	QUIETING - "Some Roads Lead To London" - "Hey Ho Nobody Home" - "Oh Happy Day" - "He's Got The Whole World In His Hand" - "Home On The Range" - "Bye'm Bye" - "Brother John" - "Zum Gali Gali" - "Michael Row Your Boat Ashore" - "Let It Be" (Beatles) PATRIOTIC - "It's A Grand Old Flag" - "It's A Small World" - "This Land Is Your Land" - "Marching To Praetoria" - "I'd Like To Teach The World To Sing" 8. Teach the accepted behaviors expected during folk dancing sessions. 9. Teach one or more of the folk or square dances during physical education program prior to departure for Outdoor School. Suggested dances: Records available in Physical Education Department. Circle or Round La Raspa Virginia Reel Patty Cake Polka-Circle Mixer Seven Jumps Hora Schottische

CONCEPT: Outdoor School is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will participate in folk dances and folk music of our heritage.

D-6 (3)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	10. Teach basic concepts of square dancing: Place and position, swing, circle, corner, do-si-do, grand right and left, honor partner and corner, promenade, ladies chain, sashay. 11. Learn two or three square dance patterns: Take a little Peek RCA LE300 Duck for the Oyster Divide the Ring
	CLASSROOM TEACHER NOTES AND COMMENTS

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CONCEPT: Outdoor school is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will identify and use tools and equipment needed in arts and crafts.

D-7 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
Demonstrate the function of craft tools and supplies. Name each tool and encourage students to use correct name of tool. Emphasize the safe use of tools to prevent accidents to students and to tools.	1. Identify tools listed below. 2. Discuss and develop safety practices for use of the tools. 3. Use some of the tools in a craft project. LIST OF TOOLS bit coping saw-blade brace & bit chisels drill, hand drill, twist glue gun gouges hammer knife mallet mitre box oiler planes rasp sandpaper saw, crosscut saw, coping pencils, wood-burning saw, hack saw, pruning scraper, wood snips, tin square, steel twine vise, wood Equipment: Sandpaper (different grades)

CONCEPT: Outdoor school is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will make a creative art form from natural materials of the site or develop a creative expression or reproduction about the site.

D-8 (1)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
On field trips: Suggest use of various natural objects for craft period. Allow students to collect natural material for crafts: Only dead or down material may be used. During craft period: Have students create their own project from natural material. During leisure-time activity or on a field trip: Have students draw a picture of the natural environment. or Have students write a story or poem about the area. or Have students construct a collage. or Have students explore use of a variety of media for creative expression.	Basic preparation: Discuss the craft period with your class. Emphasize that natural materials used must be dead or lying on the ground. Develop a story-board for an A-V record of outdoor school. (optional) Additional suggestions: 1. Have students produce an illustrated book about outdoor school utilizing all written forms of creative expression. 2. Prepare a program to show others incorporating all forms of creative expression. Each pupil at Outdoor School will create an art form from the natural materials at the site. Extra supplies such as might be necessary for the execution of the project will be available in the Santa Monica Supply Box along with the equipment for each class. To assist the teachers and children in anticipating some of the different projects which they might wish to make are:

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CONCEPT: Outdoor School is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will make a creative art form from natural materials of the site or develop a creative expression or reproduction about the site.

D-8 (2)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	ART AND CRAFTS PROJECTS 1. ASSEMBLAGES - On a base of wood or heavy cardboard, glue an arrangement of rocks, bark, twigs, pebbles, sand or other natural materials into a sculpture that stands upright. (difficult to transport if too tall) 2. RELIEF SCULPTURES - Using the piece of wood as a back (instead of the base) make an interesting relief sculpture using the different materials to create rectangles (or other shapes) of textured areas. 3. MOBILES - Using branches as the arms, construct a mobile utilizing natural forms -- wood, rocks, shells and the like. 4. LEAF PRINTS - Using light colored paints (white, yellow, orange and red) on black paper, make leaf prints. 5. COLLAGE - Using natural materials on blue colored construction paper, make a collage. Using leaves, bark, etc., create an outdoor scene. 6. PICTURES - Glue a single leaf on a colored background and develop this into a picture by adding all other shapes and details using crayon. The leaf

CONCEPT: Outdoor school is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will make a creative art form from natural materials of the site or develop a creative expression or reproduction about the site.

D-8 (3)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	could become a tree, animal, part of a person or any other shape you can imagine.
	CLASSROOM TEACHER-NOTES & COMMENTS

CONCEPT: Outdoor school is a mini-community in which each pupil can participate as a citizen and creative person.

OBJECTIVE: The pupil will make a creative art form from natural materials of the site or develop a creative expression or reproduction about the site.

D-8 (3)

Outdoor School Learning Opportunities	Classroom Learning Opportunities
	could become a tree, animal, part of a person or any other shape you can imagine.
	CLASSROOM TEACHER-NOTES & COMMENT

GLOSSARY

The following terms are used frequently in the outdoor school program. Many of the terms listed have additional or broader meanings in some uses. The particular definitions chosen are those which have specific application in the outdoor science and conservation education curriculum.

ADAPTATION - Modification of an organism or its parts that fit it better for the conditions of its environment.

ALGAE - Simple, usually aquatic plants without true roots, stems, or leaves. Almost all of them contain chlorophyll and thus are able to produce their own food. Kelp is one example.

AMPHIBIAN* - A lower form of the vertebrates having blood the same temperature as its surrounding medium--without scales, feathers, fur or hair which possess functional gills in the early stage of development. Most are aquatic as young and terrestrial as adults.

AQUATIC - Growing or living in or on water.

ASTRONOMY* The scientific study of heavenly bodies and their motions.

BACTERIA - The smallest single-celled plants without chlorophyll.

BERM - The raised outside edge of a path or road that serves to prevent or retard erosion.

CANOPY* - An overhanging screen, as of treetops, which forms the forest ceiling.

CARNIVORES - Living things that only eat meat.

CHAPARRAL - Usually dense thickets of drought-resistant evergreen shrubs. Mostly small-leaved, often stiff and thorny. Local examples of component plants: Ceanothus, manzanita, chamise, various evergreen oaks.

CHLOROPHYLL - The green coloring material of plants which is essential to food manufacturing (photosynthesis) in plants.

CLAY* - A very fine powdery earth, chiefly formed from feldspar in the decomposition of granite.

CLIMATE - Average weather conditions of an area over a period of years.

CO_2 AND O_2 CYCLE - The interchange of carbon dioxide and oxygen between animals and plants.

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*Denotes terms occasionally used in Outdoor School. Classroom teaching is optional.

COMMUNITY - The living part of an ecosystem.

CONIFERS - A group of evergreen shrubs and trees bearing true cones, such as pines, firs, etc.

CONSERVATION - The wise use of natural resources with consideration not only for today but for the future.

CONSTELLATION - A group of stars depicting an imaginary figure (for example) - Big Dipper.

CONSUMERS - Living organisms that feed on living material. They are not capable of making their own food.

CONTAMINATE* - To pollute, or make impure, often used in connection with water.

DECIDUOUS - Falling off. Used to describe plants which shed all their leaves seasonally, usually in the fall.

DECOMPOSER (REDUCER) - Organisms that break down dead material into simpler forms.

DUFF - The partly decayed vegetable matter on the forest floor.

EARTHQUAKES - Sudden slippage or movements of the earth's crust along fault lines.

ECOLOGY - Science of the relation of living things to the environment.

ECOLOGICAL IMPACT - An action which results in a negative change in the relation between living things and their environment.

ECOSYSTEM - Area in which living organisms and nonliving things function together as a unit exchanging materials of life and using them over and over again.

ENVIRONMENT - All external conditions affecting the life of plants or animals.

EROSION - The wearing away of earth or rock by various agents or forces but particularly water, air, and temperature changes.

EVERGREEN - Remaining green throughout the year--especially those trees that do not shed all leaves at one period.

FERN* - A primitive plant, feather-like in appearance.

FELDSPAR* - A mineral found in granite and other rocks--probably the most common mineral found in granite. Its color is derived from the mineral with which it is in conjunction.

FAULT - A break across layers of the earth's crust.

FILTER - To remove solid particles or impurities from water as it passes through porous soil.

FUNGI - A plant without chlorophyll that cannot make its own food but gets it from other organisms or their remains.

GALAXY* - A large group or system of stars that rotate around a center.

GALL - An unnatural outgrowth on plants due to insects or parasitic fungi.

GEOLOGY - The study of the structure and history of the earth.

GNEISS* - A metamorphic rock, generally made up of bands that differ in color and texture.

GRANITE* - An igneous rock composed chiefly of feldspar and quartz, usually with one or more other minerals; e.g., mica, hornblends.

GROUND WATER - Water that is in the ground below the surface.

HERBIVORE - Animals that eat green plants but not other animals.

HUMIDITY - The moisture content of the atmosphere at a given time.

HUMUS - The organic portion of soil; black or brown material formed by partial decomposition of vegetable or animal matter.

IGNEOUS ROCK - Rock formed by the cooling and hardening of molten materials: granite, basalt, lava.

INORGANIC - Matter that has never been living.

INSECT - Small invertebrate animals that have, in the adult stage, three clearly defined body regions, three pairs of legs and usually wings.

INTERDEPENDENCE - Reliance of two or more living things on one another for survival.

LARVAE - The young form of an insect that has hatched from the egg. (egg, larvae, pupae, adult)

LICHEN - A composite plant consisting of an algae and a fungus living together in a mutually beneficial relationship.

LIGHT-ENERGY (RADIANT ENERGY): - Energy from the sun used by green plants to make food.

LIGHT YEAR - The distance light travels in a year at a speed of 186,000 miles per second.

LIMITING FACTOR - A condition in an organism's environment that exceeds its limits of tolerance.

LITTER - The accumulation of dead leaves, branches, and other plant and animal remains that form the top layer of the forest floor.

METAMORPHIC - Rocks formed from igneous or sedimentary rocks through heat and pressure; i.e., gneiss, schist.

METEORITE* - A meteor that lands on the earth.

METEOR* - A stony or metallic piece of matter that enters the earth's atmosphere.

MICA* - The colorless to jet black mineral having flat, thin scales. Found in some granites and schists.

MINERAL - An inorganic chemical element or compound occurring naturally. Not vegetable or animal.

MOSS* - A simple flowerless green plant which grows in moist places.

NATURAL RESOURCES - Materials found in the natural state such as water, soil, sunshine, minerals that are used by man.

NONRENEWABLE RESOURCES - Resources that cannot be recycled naturally into their original form; i.e., iron, oil, metal ores, natural gas, etc.

NYMPH - The second stage of development of a simple metamorphic insect. (egg, nymph, adult)

ORGANIC - Pertaining to or derived from living organisms.

PARASITE - A plant or animal living in, on, or with another living organism from which it obtains food and shelter.

PERCOLATION - Filtration or passing of water through the soil and rocks to become underground water.

PHOTOSYNTHESIS - A process by which green plants produce food, especially carbohydrates, in the presence of sunshine.

PHYSICAL ENVIRONMENT - The inanimate surroundings necessary for life, such as air, water, soil, rock and sun.

POLLUTE- POLLUTION - To make or render unclear or impure. Used in connection with water and air in current usage.

POLLEN* - The male reproductive dust from the stamen.

PREDATOR - An animal that hunts and kills other animals for food.

PRODUCER - Green plants that have the ability to convert the sun's energy into food by the process of photosynthesis; i.e., food makers.

QUARTZ* - One of the most common minerals, makes up most of the beach sand in Southern California.

RENEWABLE RESOURCES - Resources that can renew themselves, therefore, can be used without being destroyed.

RIPARIAN - Plants or animals living along the banks of streams or other bodies of water.

REPTILE - Any of a group of cold-blooded, air-breathing vertebrates usually covered with scales or bony plates.

SAPROPHYTE - A plant that lives on dead or decaying organic matter.

SCAVENGER - An animal that consumes dead organic material.

SEDIMENTARY ROCK - Rock formed by the cementing and hardening of many layers of fine material, usually deposited by water; e.g., sandstone, shale.

SOIL - The finely divided mineral material containing organic matter, water and air on the earth's surface capable of supporting plant life.

SOLAR SYSTEM* - The sun and all the dependent bodies that revolve about it.

STAR* - A glowing ball of hot gases.

SURFACE WATER - Water that flows on the surface of the ground in streams, creeks, or springs.

SYMBIOSIS - The living together in close association of two dissimilar organisms. Usually used to indicate a mutually beneficial relationship.

WATER CYCLE - A cycle involving accumulation, evaporation, condensation and precipitation of water.

WATER TABLE - The upper level of water saturation in the ground.

WATERSHED - A region or area drained by a stream or river; sometimes the vegetation-covered slopes that facilitate seepage of precipitation into the ground.

WEATHER - The condition of the atmosphere at a given time and place, especially regarding temperature, moisture, cloudiness, etc.

WEATHERING - The physical and chemical change of rocks caused by weather.

OUTDOOR EDUCATION

GLOSARIO

Los siguientes términos son usados frecuentemente en el programa de la escuela al aire libre. Muchos de los términos en este lista tienen mas de un significado. Las definiciones escogidas son las que se usan mas en el programa de estudios de la ciencia al aire libre y educacion de conservacion.

ALGAE (Algas) - Plantas simples casi siempre acuáticas (que viven en el agua). No tienen realmente raices, tallos o hojas. Casi todas contienen clorofila por lo que pueden producir su propia comida.

AMPHIBIAN (Anfibio) - Una forma de vertebrados (sangre fria), sin escamas, plumas, piel o pelo. Poseen agallas funcionales en las primeras etapas de su desarrollo. La mayoria son acuáticos cuendo estan chiquitos y terrestres cuendo crecen. Ejemplo: ranas.

ASTRONOMY (Astronomia) - El estudio cientifico de astros celestes y sus movimientos.

BACTERIA (Bacteria) - la mas pequeña planta o animal de una sola celula sin clorofila.

BERM (Berma) - El bordo levantado de una vereda o camino que sirve para prevenir o retardar la erosion.

CANOPY (Pabellon) - Cortina colgando de la punta de los arboles formando el techo del bosque.

CARNIVOROS (Carnívoros) - Animales que comen carne.

CHAPARRAL (Chaparral) - Matorral tupido de matas siempre verdes que resisten la sequía. La mayoria tienen hojas chicas, tiesas y espinosas. Ejemplo: Manzanita (ceanothus) y varios encinos.

CHLOROPHYLL (Clorofila) - el material verde que da color a las plantas el cual es esencial para la produccion de sus alimentos.

CLAY (Arcilla) - Tierrita muy fina formada en su mayoria de feldespato el cual es derivado de la descomposicion del granito.

CLIMATE (Clima) - Promedio de las temperaturas de una area a través de un periodo de años.

CO_2 AND O_2 CYCLE - El intercambio de dioxido de carbono y oxígeno entre animales y plantas.

COMMUNITY (Comunidad) - El conjunto de organismos vivientes con relaciones mutuas entre si mismos y el lugar donde viven.

CONIFERS (Coníferos) - Un grupo de plantas y arboles que dan conos, como pinos, abetos, etc.

CONSERVATION (Conservación) - El uso apropiado de los rescursos naturales para el beneficio de la gente.

CONSUMERS (Consumidores) - Organismos vivientes que se mantienen de material viviente. No estan capacitados para producir su propia comida.

CONTAMINATE (Contaminar) - Corromper o hacer impuro, con frecuencia se usa en relación con el agua.

DECIDUOUS (Caedizo) - Objeto que se cae - usado para describir matas o plantas que pierden sus hojas en cierta estación, generalmente en el otoño.

DECOMPOSER - REDUCER (Descomponedor - reducidor) Organismos que desbaratan material muerto.

DUFF (Escombro) - Acumulación de hojas, yerbas, etc. parcialmente descompuestas en un bosque.

EARTHQUAKES (Temblores) - Resbale repentino o movimiento de las capas terrestres al lado de las aberturas.

ECOLOGY (Ecologia) - Ciencia que estudia la relacion entre las cosas vivientes y el ambiente en que viven.

ECOLOGICAL IMPACT (Impacto ecologico) - Una acción que causa un cambio negativo en la relación entre las cosas vivientes y su ambiente.

ECOSYSTEM (Sistema ecologico) - Una unidad formada de la comunidad viviente (los animales por ejemplo) y el ambiante en que viven.

ENVIRONMENT (Ambiente) - Todas las condiciones externas que afectan la vida de las plantas o animales.

EROSION (Erosión) - El desgaste de tierra o roca por varios factores o fuerzas pero en particular por el agua, aire, y cambios de temperatura.

EVERGREEN (Siempreviva) - Que permancecen verdes todo el año - especialmente aquellas matas o arboles que no pierden sus hojas al mismo tiempo.

FERN (Helecho) - Una planta primitiva, parecida a las plumas.

FELDSPAR (Feldespato) - Mineral que se encuentra en el granito y otras rocas pero es mas comun en el granito. Su color se deriva del mineral en el que se encuentra.

FAULT (Falla) - Abertura o quebrada en la superficie de la tierra.

FILTER (Fieltro) Limpiar particulas sólidas o impurezas del agua al pasar a traves de tierra porosa.

FUNGI (Hongos) - Una planta sin clorofila que no puede producir su propia comida y la obtiene de otros organismos o sus restos.

GALAXY (galaxia) - Un grupo de estrellas muy pequeñas para poderse ver separadamente sin telescopio, ejemplo: "Via Lactea."

GALLS (Agalla) - Bolitas anormales que estan en las plantas. Son causadas por organismos ajenos.

GEOLOGY (Geologia) - El estudio de la estructura e historia de la tierra.

GNEISS (Gneis) - Roca metamórfica generalmente formada de capas, las que se diferencian en color y textura.

GRANITE (Granito) - Una roca ignea compuesta principalmente de feldespato y cuarzo y uno o mas minerales, por ejemplo Mica, Hornblande, etc.

GROUND WATER (Agua subterranea) - Agua que corre debajo de la superficie.

HERBIVORE - (Herbívoro) - Animales que comen plantas pero no comen otros animales.

HUMIDITY (Humedad) - El contenido de humedad en la atmosfera.

HUMUS (Humus) - La porción orgánica del suelo; material negro o cafe formado por la descomposicion parcial de materias orgánicas de origen vegetal o animal.

IGNEOUS ROCK (Piedra Ignea) Roca formada por el enfriamiento y endurecimiento de materiales derritidos: granito, basulto (roca volcánica), larva, etc.

INORGANIC (Inorgánico) - Compuesto de materia que no es ni animal ni vegetal, no orgánico.

INSECT (Insecto) - Pequeños animales invertebrados (sin columna vertebral) que tienen en la etapa de adultos tres partes definidas en su cuerpo, cabeza, torax y abdomen, tres pares de patas y generalmente alas.

INTERDEPENDENCE (Interdependencia) Dos o mas cosas vivientes que dependen una de la otra para sobrevivir.

LARVAE (Larva) - Primer estado de los insectos, batracios y algunos peces.

LICHEN (Liquen) - Una planta combinada compuesta de una alga y un hongo viviendo juntos en una forma beneficiosa para los dos.

LIGHT YEAR (El año de luz) - La distancia que la luz cubre en un año viajando a la velocidad de 186,000 millas por segundo.

LIMITING FACTOR (Factor limitador) Factor que limita el crecimiento de algo. Por ejemplo si no hay mucha agua en un lugar, esto limita el número de plantas que pueden crecer alli.

LITTER (Desechos) - La acumulación de hojas muertas, ramas y otros escombros de animales y plantas que forma la tapa de abajo de un bosque.

METAMORPHIC (Metamórficas) - rocas formadas de rocas igneas o sedimentarias a traves de temperaturas altas y presión.

METEORITE (Meteorito) - Un meteoro que cae sobre la tierra (Fragmentos de planetas)

METEOR (Meteoro) - Materia metálica o rocosa que cruzala atmosfera de la tierra.

MICA (Mica) - Mineral brilloso, negro y transparente que se encuentra en el granito.

MINERAL (Mineral) - Un elemento o compuesto químico que no es orgánico y aparece en la naturaleza. No es vegetal ni animal.

MOSS (Musgo) - Planta verde simple sin flores que crece en lugares húmedos.

NATURAL RESOURCES (Recursos Naturales) - Materiales que se encuentran en su estado natural y son usados por el hombre. Por ejemplo el agua, luz del sol, minerales, etc.

NON-RENEWABLE RESOURCES (Recursos Irrenovables) - Recursos naturales que no pueden volver a su forma original, ejemplo: aceite, hierro, gas natural, etc.

NYMPH (Ninfa) - La segunda etapa en el desarrollo de un simple insecto metamórfico.

ORGANIC (Organico) - Relativo o derivado de organismos vivientes.

PARASITE (Parásito) - Una planta o animal que vive en, sobre o con otro organismo viviente, del cual obtiene comida.

PERCOLATION (Filtración) - Filtración o escurrimiento del agua a traves de la tierra y las rocas para hacerla agua subterranea.

PHOTOSYNTESIS (Fotosíntesis) - Proceso por el cual plantas verdes producen comida, especialmente azucar y harinas con la presencia de la luz del sol.

PHYSICAL ENVIRONMENT (Ambiente Físico) - Los alrededores inanimados necesarios para poder vivir, como el aire, agua, tierra, piedras y el sol.

POLLUTE, POLLUTION (Contaminar, contaminación) - Hacer algo sucio o impuro. Es especialmente usado en conexión con el agua y el aire.

POLLEN (Polen) - El polvo masculino reproductivo del estambre.

PREDATOR (Voraz) un animal que mata a otros animales para comer.

PRODUCER (Productor) - Plantas verdes que tiene la habilidad de convertir la energia del sol en comida con el proceso de fotosentesis.

QUARTZ (Cuerzo) Uno de los minerales mas comunes, compuesto en su mayoria de arena de las playa del sur de California (Cristal de roca)

RENEWABLE RESOURCES (Recursos renovables) - recursos naturales que pueden renovarse a si mismo y por eso pueden usarse sin acabar con ellos, ejemplo: Agua.

RIPARIAN (Ribereno) - que viven en los lados de los arroyos, rios o del mar.

REPTILE (Reptil) - Cualquier animal de sangre fria, de respiración pulmonar, vertebrados y casi siempre con el cuerpo cubierto de escamas o laminas dérmicas, ejemplo: los cocodriles.

SAPROPHYTE (Saprófito) - Planta que se mantiene de materia orgánica muerta o en descomposición.

SCAVENGER (Rapaz) - Animal que consume materia orgánica muerta. Ejemplo: Buitres.

SEDIMENTARY ROCK (Piedra Sedimentaria) - Piedra formada con los asientos endurecidos de diferentes materias generalmente depositadas por agua. Ejemplos: Piedra arenisca y arcilla.

SOIL (Tierra) - Las particulas de material mineral que contiene materia orgánica, agua y aire, que esta en la superficie de la tierra. Es capaz de sostener la vida de plantas.

SOLAR SYSTEM (Sistema Solar) - El sol y todos los astros que rotan alrededor de el.

STAR (Estrella) - Una bola luminosa de gases calientes.

SURFACE WATER (Agua de la superficie) - Agua que corre en la superficie de la tierra, en rios, arroyos o manantiales.

SYMBIOSIS (Simbosis) Asociación de dos organismos similares que viven juntos. Esta palabra se usa generalmente para indicar una relación beneficiosa para los dos organismos.

WATER CYCLE (Ciclo del agua) - Un ciclo (serie de fenomenos que se siguen en un orden determinado) en el que se incluyen la acumulación, evaporación, condensación y precipitación del agua.

WATER TABLE (Mesa de Agua) Capa de encima de la tierra impregnada de agua.

WATERSHED (Linea divisoria de las aguas) - La region o area en la cual desemboca el agua de un rio o arroyo, a veces esta palabra se refiere a las lomas cubiertas de vegetacion la cual facilita que se consuma el agua en la tierra.

WEATHER (Tiempo) Condición de la atmosfera en cualquier momento especialmente en lo que se refiere a la temperatura, humedad, nubosidad, etc.

Spanish definitions developed by Sallie Cowan, Los Angeles County Outdoor School, and Amtaro Swire, Santa Monica Unified School District.

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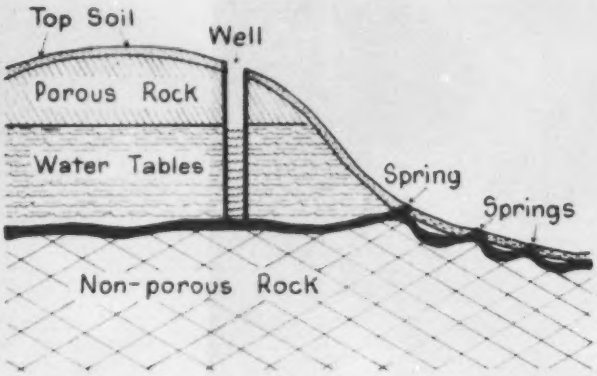
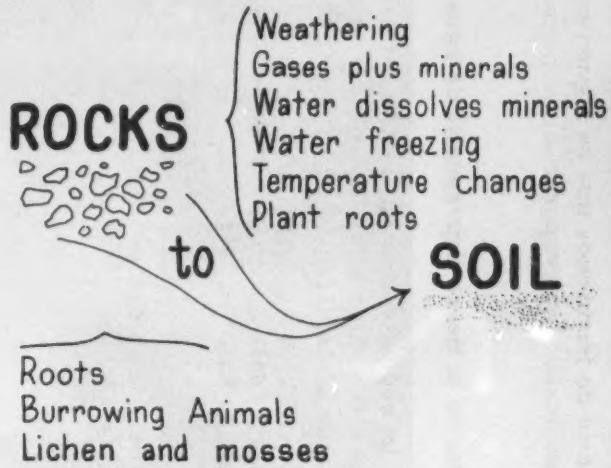
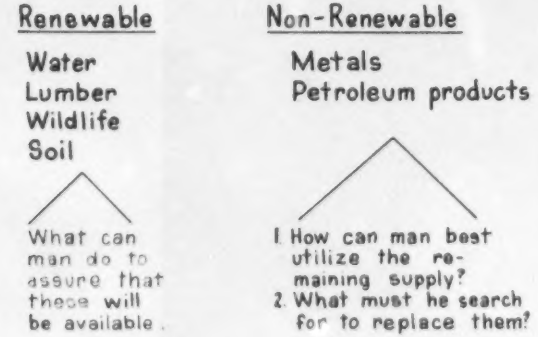


A. The Formation of Springs



B. Rocks Changing into Soil

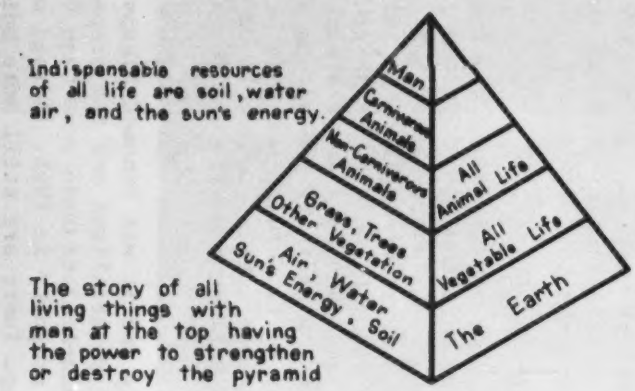


C. Natural Resources

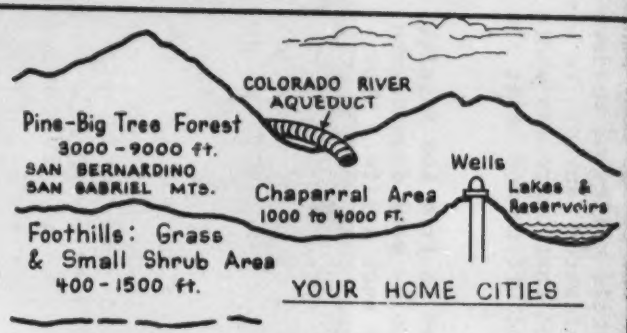
O + H + F = Fire

Remove any one to extinguish

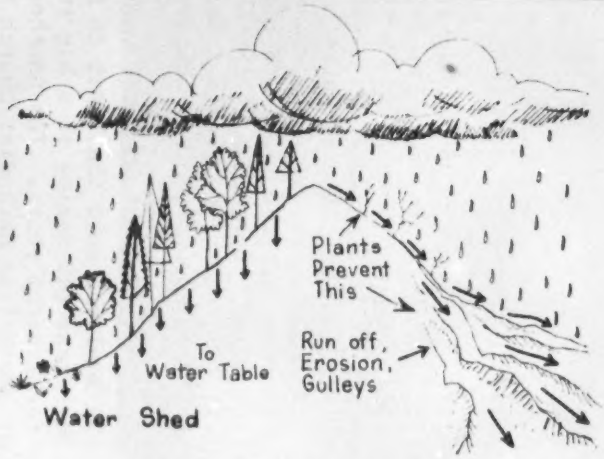
D. The Fire Triangle


Indispensable resources of all life are soil, water air, and the sun's energy.
Man
Carnivorous Animals
Non-Carnivorous Animals
All Animal Life
Grass, Trees Other Vegetation
All Vegetable Life
Air, Water Sun's Energy, Soil
The Earth
The story of all living things with man at the top having the power to strengthen or destroy the pyramid

Z. Pyramid of Life



F. Water Sources



. Plants vs. Erosion

Other Charts

1. Carbon Dioxide Cycle
2. How Springs Are Formed
3. Food Chains
4. Seed Travels
5. Non-Renewable and Renewable Resources

H. Other Charts

THE HISTORY OF COLBY RANCH

Delos Colby came to upper Big Tujunga Canyon in search of gold in 1889. He found some pay dirt that he worked until it ran out in 1890. On one of his many hunting trips, he was led by a Mexican miner friend into a little valley of meadows with luxuriant vegetation fed by cold water springs -- Coldwater Canyon. He was charmed with the spot and its possibilities and determined that there was where he would build his home. He filed his claim with the Land Office and built the first cabin.

Five years later the wife and daughter, Nellie, were moved in from Los Angeles. Most of the land had to be cleared, but both Ma and Pa Colby were descendents of old pioneer families so their training fitted them for such a life. They could turn their hands to anything necessary. They planted crops, built a reservoir on the mountainside, led water to it from springs at the upper end of the valley and built a sawmill on the bank of the stream (which is being restored). All lumber for the buildings came from the woodlot above the ranch and was sawed at the mill by the stream.

Everything that came from the outside world had to be packed in from Acton or up sixteen miles of narrow, crooked trail from the mouth of Arroyo Seco. It took ingenuity and grit to drag the equipment up the mountainside and to endure the trials of fire, flood, and storm. While Colby went to Alaska seeking gold in 1897 the two women managed to keep the ranch going and, as a way to use the surplus produce from their gardens and orchards, they advertised a resort for hikers and hunters. Colby's soon became a popular headquarters for mountaineers of that day and did a flourishing business for several years. Just when the family gave up hope of seeing him again, Colby came up the Strawberry Trail just at dusk. He had returned broken in health and empty handed.

In early spring of 1905 government engineers appeared at the ranch announcing they had come to establish the property lines. In 1907, sixteen years from the time he built the first cabin, Colby was granted his homestead rights. Until then his status had been that of a squatter.

He built a new house and other buildings and the family was joined by a friend of the family, Joe Argay, who stayed to help run the ranch after Pa Colby died in 1918. Nellie, who had grown into a beautiful woman, died shortly after her bridegroom was killed in Service in 1914. When Ma Colby died in 1928 in a fire that destroyed the home, there was no will and the property went to relatives instead of to Joe, who couldn't bear to leave this place that held so many memories for him. He moved off the ranch and built a squatter's cabin by the stream near the north boundary. He called it the Hermitage and he faithfully kept weather and rainfall records for the weather bureau and the Los Angeles County Flood Control. This, too, burned in 1937 but Joe escaped and lived his life out in the canyon he loved.

In 1936 the Moultons sold the Ranch to H. K. Koebig and it was renamed Sleepy Hollow Ranch. The plans for making it a big resort never materialized and the property lay idle for several years. The Southern California-Arizona Conference Camp Commission of the United Methodist Church bought the property in 1945. A road was built, the stream bridged, and new buildings put up. There are still more buildings planned and improvements are being made each year.

HISTORY OF THE LOS ANGELES COUNTY OUTDOOR SCHOOL

In May, 1960 the Los Angeles County Superintendent of Schools received requests from seven school districts for assistance in developing a program of outdoor science and conservation education for their sixth grade classes. The Los Angeles County Board of Education approved County Office service to these districts, and the task of organizing the program and getting it started was assigned to the Division of Health, Physical Education and Youth Services with Jack Davidson serving as coordinator.

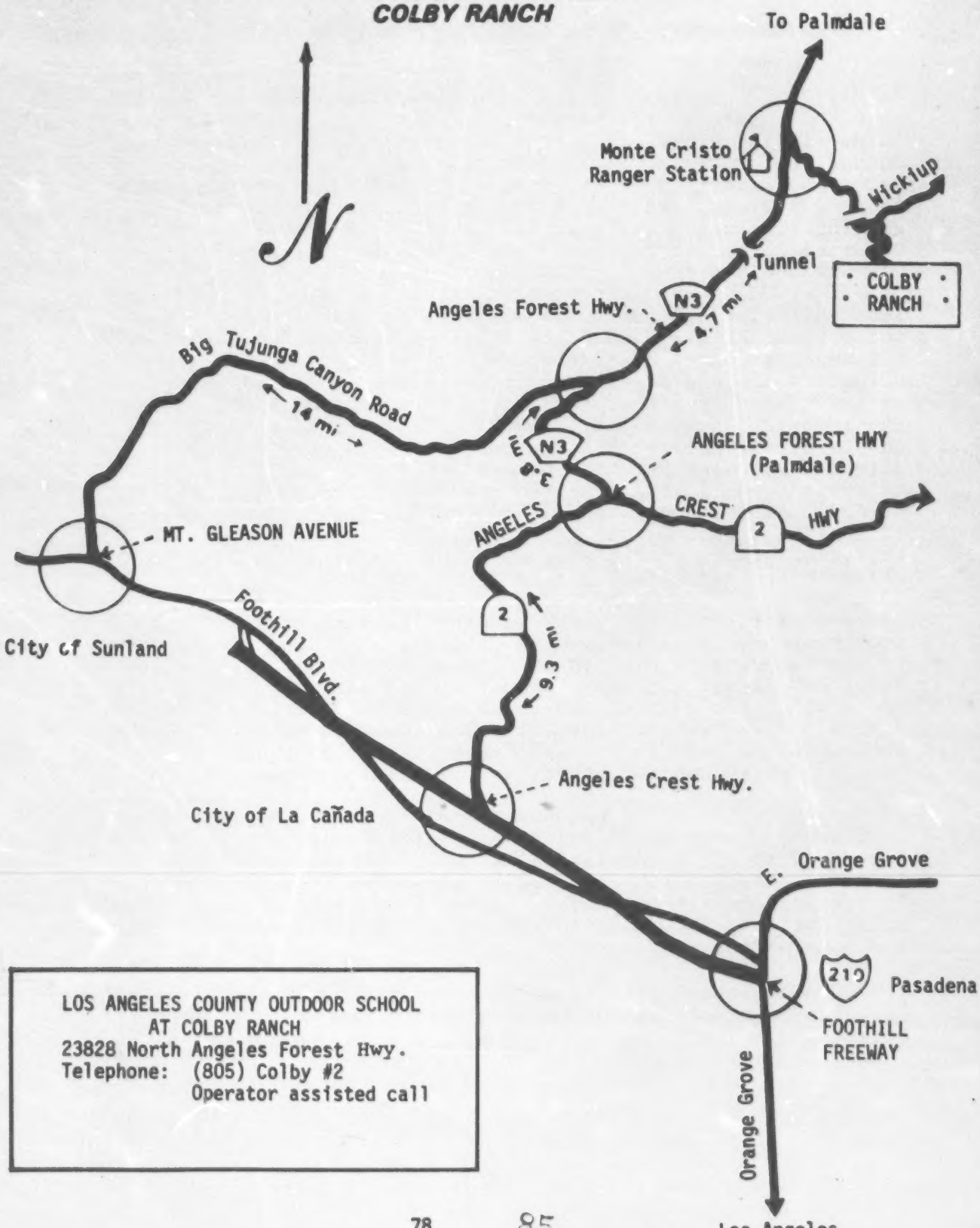
Seven districts (Bassett, Bloomfield, Castaic, El Segundo, Los Nietos, Rivera, and South Whittier) contracted with the Los Angeles County Superintendent of Schools to conduct an outdoor science education and conservation education program of two classes per week for thirty-three school weeks during the 1960-1961 school year. Funds were budgeted through the County School Service Fund to pay for employees' salaries, site charges, and purchase of equipment and supplies required to operate the school. Agreements were drawn up and properly signed. At the conclusion of the outdoor school year, participating school districts were billed proportionately for the actual costs of the program according to the number of children who had attended from the district.

The site for the first year was Glenn Ranch in Lytle Creek, near Fontana, California. The original staff included a principal, Jack Waters; three outdoor school teachers -- Tom Bell, Pat Jayne, and Russ Rasmussen; and six cabin counselors. Two sixth grade classes and their classroom teachers from the Rivera School District (now El Rancho Unified School District) arrived on the site on Monday, September 19, 1960 and the Los Angeles County Outdoor School was in session.

In September, 1961 the Outdoor School moved to Forest Home Conference Center near Redlands, California and the staff was increased to six credentialed teachers and thirteen cabin leaders. The program returned to Glenn Ranch in 1965, where it remained for three years. Colby Ranch, approximately twenty miles north of La Canada in the Angeles National Forest, became the home of the Outdoor School in 1968.

The Outdoor School program is now coordinated by the Division of Curriculum and Instructional Services with Arie Korporaal, Program Specialist, as coordinator.

DIRECTIONS TO
LOS ANGELES COUNTY OUTDOOR SCHOOL
COLBY RANCH



LOS ANGELES COUNTY OUTDOOR SCHOOL
AT COLBY RANCH
23828 North Angeles Forest Hwy.
Telephone: (805) Colby #2
Operator assisted call

ON THE ROAD TO COLBY RANCH

From Notes by Dr. Richard F. Logan, Professor of Geography, UCLA

The first part of the trip may be by freeway.

What is a freeway?
How does it differ from ordinary roads or streets or highways?

It has no traffic lights
It has no stop signs
It crosses all other streets on bridges or under bridges
There are no stores along it
No houses can be reached from it
No pedestrians are permitted on it
No one is allowed to stop on it, except in emergencies
There is always a divider between traffic lanes in opposite directions

Why do we have freeways?

Notice the road cuts made when the freeway was built.

You can see rocks exposed in the road cuts.

They may be tilted at various angles. These beds of tilted rocks are sedimentary rocks.

What has happened to the road cuts since they were made?
(rainwater is wearing rills (little channels) into the faces of the cuts)

The hillsides are covered with chaparral.

These bushes are very flammable

Part of the trip on the freeway may be on the floor of a flat valley. The floor of the valley is made of alluvium washed in from the surrounding mountains.

Portions of the freeway are built on an enbankment and we can look over the surrounding area.

Most of the area is residential.
Occasionally there is a major street lined with stores.
It is a string street commercial development or a ribbon commercial development (the two terms are interchangeable).

The plantings along the freeway are of exotic plants brought in from some other part of the world.

They have to be watered regularly -- watch for areas where the sprinklers are going.

Why do they have to be watered? Because it does not rain in Southern California through the entire summer. What do we call areas that have rain in winter and a dry summer? Mediterranean lands.

We leave the freeway and travel on city streets.

How does the traffic on the city street differ from that on the freeway?

It is slower
It is stop-and-go
There are many traffic lights
There are people afoot and on bicycles
Cars park along the curb and sometimes cause traffic to stop as they park
There are sidewalks
In many cases there is only a white line between traffic lanes in opposite directions

As we leave the city and travel on the Angeles Crest Highway we enter the Angeles National Forest.

The road climbs very steeply -- notice the elevation markers (2000 feet, etc.)

Much of this area has been burned badly in the past -- look for charred stumps of the larger bushes.

This is chaparral again.

Watch for the tall stalks and white blossoms or seed pods of chaparral yucca (our Lord's candle)

In some of the gullies and on steep shady north slopes, watch for big trees, like huge scraggly Christmas trees. They are big cone spruce.

The road clings to the steep sides of V-shaped valleys. At one place it passes through a tunnel.

The rock exposed in the hillside cuts is not sidimentary rock

It does not have nice beds like those in the Santa Monica Mountains.
It is granite and gneiss. We will look at them more closely at Camp Colby.
They are very hard rocks, which is one reason why these mountains are much higher.

High in the mountains, we turn off the tarred road onto a dirt road leading to Colby Ranch.

NOTES ON THE COLBY RANCH AREA

GEOLOGY

Two kinds of bedrock in the area

granite -- formed from molten rock (called magma), hence igneous rock.
very deep beneath the surface
blanketed by other rock above, which kept it hot for a long time
individual crystals clearly visible to the naked eye, composed of different minerals: quartz, feldspar, mica, black minerals (pyroxene, amphibolite)
some of the surface rock today is quite rotten, falls apart
stained with iron rust, which has come from iron in the mica and from the black minerals

As the mass of molten rock cooled it solidified; as it cooled further, the solid rock cracked. This formed joints, cracks which help the breakup of the rock into blocks.
Today some of the joints have been filled with other material -- quartz (very hard) and calcite (can be scratched with a knife).

All this can been seen easily on the hillside just west of the dining hall, where the rock that is rotting away is exposed in the border of the path leading to the viewpoint looking down valley.

This granite was formed very deep in the earth and has been exposed only after all the overlying rocks have been stripped away by erosion -- which takes millions of years to do.

gneiss -- formed by the complete alteration of granite as the result of heat and pressure after the granite had completely cooled and hardened into rock.

Minerals formed into bands running through the rock. Mica forms black bands; quartz and feldspar form gray or white bands; bands are usually wavy, crumpled, or twisted.

Occurs as loose boulders on the ground in the campsite having been washed down from higher up by the stream.

Also formed very deep, exposed by erosion of rocks overlying the gneiss.

GEOMORPHOLOGY

The entire San Gabriel Mountain range has been formed by block faulting. Movements of the earth's crust have caused breakage along certain lines. The mountains have been lifted up in a series of separate blocks. Later erosion has carved the valleys and canyons into the surface of these blocks, producing the modern topography.

The recent uplift has been quite rapid and quite strong:

> It has caused streams to flow very swifty; swift-flowing streams erode their beds rapidly since fast-moving water can carry away a large amount of soil and stones. This erosion has taken place at the bottoms and sides of the streams, causing them to cut downward rapidly. Thus the stream has cut itself a very deep, very narrow valley. This produces a steep-sided, V-shaped valley. Just west of the dining hall, from the viewpoint on the ridge, you can look down into such V-shaped valleys. The ridges are narrow crested. There are very few flat places on them.

The slopes are continuously subjected to movement of soil down the slope.

> Some of this is washed down the slope after heavy rains. Once in a while a stone rolls down the slope. All the while the soil covering the hillside is slowly moving down the slope, the whole mass is moved by a combination of expansion and gravity. This is called creep. When it is hot, the soil expands; when it is cold, it contracts. However, it cannot expand or contract upslope because of the weight of the soil above it, so it only goes down. The same thing happens when the soil expands as it gets wet or shrinks as it dries.
>
> All this can be seen in the way some trees grow, with their trunks curved out and up from the hillside -- they were gradually bent over as the soil moved down, but their tops kept growing up toward the sun and the sky.

Much of the soil about the camp has gradually moved down in this fashion.

There is almost no flat land anywhere, even in the stream valley bottoms.

CLIMATE

The area is much higher than Santa Monica; hence it is much colder in winter. In summer, the sea keeps Santa Monica cool; so it is much warmer at Camp Colby in summer.

The Colby area is high enough to get some snow in winter but not enough for skiing.

In summer the sea air moves in daily across the coastal basins. The smog collects in it but cannot rise upward out of it, being held down by very hot air above. Thus the air at Colby is usually quite free of smog.

In winter the situation is not as simple and it changes frequently. At times smog comes up into the mountains but not as thickly as it is in the coastal area below.

On many rather calm nights, a downslope breeze of cooler air draining downward occurs, blowing especially down the little valleys like the one through camp. At first it is noticeable in the movement of smoke, which drifts down-valley, and in the smells that do the same. Later it may become quite a strong wind.

In the daytime, when it is otherwise calm, a gentle upslope breeze is likely to occur; and, in summer, this combines with the seabreeze in the lowlands to become quite a strong breeze. When downslope breeze is working on calm nights, it is usually very much cooler in the valley bottoms, like at the campsite, than it is on the ridgecrests right nearby.

VEGETATION

The hillsides about camp are covered with chaparral. This is very well adapted to long summer droughts. Many of the plants have hard, shiny leaves that look varnished. Common plants are:

chaparral yucca (yucca whipplei) -- tall stalks with white flower on top of big pods with small black seeds; grows up from a round dome of dagger-like green leaves close to the ground.

manzanita (arctostaphylos spp.) -- lovely smooth, reddish-brown branches with light green leaves, many of which are arranged vertically. Small berries look like tiny apples (manzana in Spanish for apple).

chamiso (adenostoma fasciculatum) -- tiny leaves growing in little bunches all tied together at the base.

yerba santa (eriodictyon californicum) -- large leaves, toothed along edges, covered with down.

scrub oak (quercus dumosa) -- small leaves with many teeth on edges. Acorns.

greenbark ceanothus (ceanothus spinosus) -- green bark on trunk and branches. Very fragrant delicate blossom. Spine-tipped branches in some cases.

The main camp area, lying in the valley bottom and, thus, along the brook, is an area of riparian vegetation. Here it consists of trees, some of them as much as 100 feet tall. The common species are: incense cedar, sycamore, big leaved maple, walnut, alder, canyon live oak, cottonwood, cypress (introduced from Europe), apple (introduced from Europe).

Some of the trees have clusters of the semi-parasitic "mistletoe".

ALTERATION OF THE ENVIRONMENT

Originally the campsite itself was too steep for construction and flat areas and roads were bulldozed, retaining walls were built, and the stream channeled.

What is the source of fuel at Colby Ranch? Why isn't firewood used?

There was a bad brush fire on the hill to the southwest. What was its cause? (smoking) What is done today to prevent fire from damaging the camp? (ground is cleared around each building)

Why are the roads so crooked? What could be done to straighten them? (it would be necessary to make great cuts in the hills, which would destroy the beauty of the area and would increase soil erosion)

THE ROLE OF THE UNITED STATES FOREST SERVICE

National Forests were established to:

insure a supply of timber (only applicable to higher parts of these mountains)
protect watersheds
make optimum use of the land

The first two purposes are interpreted now as when the National Forests were first created, but interpretation of "optimum use of the land" has changed with time.

Originally farming had first priority and ranching second. Camp Colby occupies an early homestead granted on the basis of its farming-ranching potential (Colby Ranch). Some of these farms or ranches that existed within the boundaries of the newly established National Forest are still farmed or ranched; some have been sold or diverted to other uses; some have reverted to the County for nonpayment of taxes after the property was abandoned; some have been purchased by speculators and held until buyers are found (which is quite a different purpose than originally intended). This explains the existence of cafes, camps, private housing in the National Forest. Today, with the great need for recreational space for people of urban Los Angeles, the emphasis has changed and optimum use of Angeles National Forest now is recreational--public campgrounds and private camps like Colby Ranch, on private land within the National Forest.

WE CALL IT CHAPARRAL

Something that makes living in California so interesting is the nearness to extremes. We are able to see the highest and lowest points in the United States; we can visit areas of extreme drought and abundant glacier-producing snow. We can wonder at the Sequoias, which are the world's largest trees (32 feet in diameter) as well as the tallest (364 feet high). At the other extreme we find the peculiar and unique pygmy forests of Southern California. Examples of dwarf forests are occasionally found throughout the world. In Australia they consist mostly of eucalypti; along the Mediterranean these dwarf forests are mostly acacias; and dwarf forests are also found in Chile and Peru -- but the pygmy trees of Southern California are outstanding in uniformity and variety. The English referred to these dwarf forests as the elfin forest. The Spanish used "chaparro" which means scrub oak. From this Spanish derivation comes our present term -- chaparral, which is now used to cover many kinds of dwarf trees and plants.

There is a good explanation for the dwarfism of these trees. We know that a green plant produces food necessary for its growth. (Water from the soil is transported to the leaves where it combines with carbon dioxide in the presence of chlorophyll and sunlight to produce food.) Food is manufactured primarly during the wet season. In some areas of Southern California there are usually only two seasons -- wet and dry -- with the wet season often limited in length. In fact, some plants are able to produce food only about 30 days in each year. Even though other chaparral shrubs are active longer, they still have a relatively short growing season. As a result these plants are frequently dwarfed because so little growth is made during the year. The dwarf condition is also the result of periodic "die backs". The plants then must depend on resprouting for the next year's growth.

This limited growth has resulted in some peculiar structural features and characteristics. Old trees are only five to six feet tall, and their limbs are only two or three inches thick. In contrast to familiar Eastern trees, chaparral trees have their dormant period during the summer dry season and are active for only two or three months during the winter growing season. This explains why the elfin forest is flamable and such a fire hazard.

It is relatively common for the small abundant flowers of chaparral species to produce large quantities of minute seeds. The tough weed is often crooked, bone-like in hardness, and its dense branches are frequently thorny and repellant. The plants are particularly adapted to conserve moisture. The small, hard leaves are often vertical to the sun and are sometimes hairy, waxy, or curved. The penetrating roots seek moisture three times more deeply than the average tree. Pressures develop in the roots that can split granite.

Of the four chief types of trees in the chaparral, chamise is probably most abundant. Its swollen roots burn like fat and were important fuel for the pioneers. Ceanothus or buckthorn bursts into a parade of bloom early in the spring. The flowers rubbed in cold water make a good soap and were used by the Indians as a cleansing agent. The leaves and twigs are prized as food for deer, sheep, and cattle.

Excessively crooked branches characterize the "little apple" or manzanita as the Spanish called it. Fifty years ago a reward of $5,000 was offered for a straight five-foot branch. The reward was not claimed. The small fruit is sought by bear and must actually pass through an animal before the seeds in the fruit will germinate.

The various scrub oaks produce abundant food for man and animals. From the acorns the Indians made their staff of life.

Other components of the chaparral include the coffee berry plant, the bark of which the Indians boiled to make a tonic tea. The sap from the sugar bush was used as a concentrated sugar. The yerba santa was regarded as a cureall, especially for colds and lung ailments. The tiny black seeds of the sage or native mint were a source of concentrated nourishment.

A most versatile plant is the yucca. Its roots were used for soap, the stem was boiled and eaten like squash, the fibrous leaves were used for twine, and the ground and cooked seeds made a meal or gruel.

With the Spanish came their heritage of land abuse. They saw little use for the elfin forest. It was not good as pasture and therefore they burned the chaparral. The sheep and cattle grazed the land clean of vegetation. The early Americans, too, were discouraged with the land. The lumber was not straight and the wood would not split. The elfin forests were useless. Then in the 1880's Abbott Kinney, a rancher in the area which is now Pasadena, observed that the destruction of chaparral caused an increase in flood damage and a lowering of the ground water table.

Today we realize that every creation of nature has value. To us in Southern California, the value of this forest is inestimable. This canopy of vegetation tames the raindrop and conducts it gently into the porous soil below. The litter of humus acts as a sponge to hold the water in a natural underground reservoir.

Chaparral exists in the region of available water between the desert with minimum water and the normal forest with greater amounts of water. In addition to providing natural beauty, the natives of Southern California landscape are protecting us from ravages of erosion and drought, of rampaging waters and deluges of mud from the foothills. For this we owe a great deal to the flora we call chaparral.

Adapted by personnel of the staff of the Office of the Los Angeles and Riverside County Sueprintendents of Schools from information obtained by Rodney Ellsworth, Instructor, University of California at Los Angeles, Extension.